CHAPTER 1

INTRODUCTION

Background

(a) Rationale

The economy and livelihood of the people of the Kingdom of Tonga is based largely on agriculture. Tongan agriculture is predominantly dependent on smallholder production and dominated by production for consumption and the domestic market.

The pumpkin industry is a recently established multimillion dollar agricultural export industry in the Kingdom. It was started in 1987 by a Tongan farmers' group under the supervision of Group Trade Limited of New Zealand. The pumpkin (*Cucurbita maxima*) is a short term vegetable crop which is specifically grown for the niche market in Japan.

The industry is operated by pumpkin exporting companies and associated farmers' groups with support services contributed by the government ministries and financed by the Tonga Development Bank.

Due to a drought in 1987, the first attempt to grow pumpkins for export was not successful. However, the industry started to show signs of success in the 1988 pumpkin season. In the 1989 and 1990 seasons Tongan pumpkins began to
become established in the Japanese import market and more Tongan farmers and exporters were attracted to participate in the development of the industry.

Because of the perceived profitability of the industry in the 1990 season, many farmers and exporters were attracted to compete in pumpkin growing and exporting pumpkins in the 1991 season. At the same time the decision makers, especially the exporters, did not realise that the total market share for the market niche was limited, or that the Japanese consumers required top quality pumpkins. Instead the exporters heavily oversupplied the market with low quality and undersized pumpkins.

The pumpkin rush in the 1991 season caused an open competition amongst the exporters and their respective farmers' groups for the limited market share of the Tongan pumpkin exports, resulting in a crisis for this fragile industry. Although the 1991 pumpkin season brought to Tonga the highest foreign exchange earnings ever made by any agricultural export commodity, the irresponsible actions of the farmers and exporters as well as quarantine and quality inspectors had severely damaged the establishment of Tongan pumpkins in the Japanese market. This is a matter of serious concern as this niche market is crucial for the economic development of Tonga in general and to the farming community in particular.
The aim of this research project is to assist in developing the niche market and to establish Tongan pumpkins in a competitive position against the external competitors.

The pumpkin industry is regarded by the Government and agricultural export companies as well as the farming community as the most important and profitable agricultural industry developed in recent years. This is not only because of its high foreign exchange earnings but also because it creates employment opportunities and provides income to rural communities to improve their standard of living. As Hardtaker et al. (1988) reported, smallholder agricultural production is the main source of employment and income for the Tongan population.

Because the pumpkin has dominated the export markets, the Government, export companies and farmers have taken the pumpkin industry as their first priority in agricultural development. The main reasons are: 1) all parties involved in the development of the pumpkin industry perceive pumpkins to be a profitable crop; 2) pumpkins are a short term crop (about 85-90 days from planting to harvest), and easy to manage; 3) financial assistance to growers and export companies through credit is readily available from the Tonga Development Bank as one of the government developmental objectives; 4) the industry has a potential niche market in Japan; 5) technology transfer through Government services such as research and extension are available free; and, 6) it
gives the highest net foreign earning and income to the people of Tonga.

The crisis in the 1991 season has demonstrated that the operation of the pumpkin industry was not properly coordinated and that there is a lack of cooperation amongst exporters, their farmers' groups and the government departments. Cooperation is especially important in coordination in the issuance of exporting licences to exporters, in industry planning and in implementing the production and marketing process of the industry.

Without cooperation between the exporters, farmers' groups, government departments and the Tonga Development Bank, the niche market for pumpkin exports certainly will not be long lasting and Tonga's external competitors will take advantage of the poor performance of the Tongan pumpkin industry.

These concerns have stimulated the author to conduct this research to explore and identify the problems and concerns perceived by the parties involved in the operation of the industry. There is a need for coordination and cooperation amongst those parties involved in planning and implementing the operation of production and marketing so that improvement can be made to the overall performance of the industry. Thus, a collaborative approach to the industry's concerns is essential.
In order to meet the need for collaborative planning and action, the researcher utilised an action research approach to bring some of the decision makers and implementors in the industry together to collaborate in the formulation of improved strategies for developing quality standards as well as the activities involved in the industry. Action research in this context is considered an appropriate approach as it focuses on collaborative and participative discussion aiming for change and improvement of a real situation. The significance of the action research as an approach to the situation of the industry is discussed in the section of the methodology.

**Personal Background to this Research**

As an Agriculturist for many years in the Ministry of Agriculture and Forestry involved with the development of cash crops of the smallholder farmers, recently I have been employed by the Tonga Development Bank as an Assistant Manager in the Agricultural Loan Division. My job has been the appraisal and the approval of loans to farmers' agricultural projects including pumpkin growing.

Given an opportunity to do further study in Australia in the field of agricultural development with an emphasis on production and marketing, I have been fortunate to undertake this study at the School of Agriculture and Rural Development of the University of Western Sydney. The School encourages
research projects in real situations, emphasising the use of a systems approach.

The systems approach is an holistic view of a situation as a system involving human activity and its surroundings (Checkland and Scoles, 1990). Emphasis is placed on effective learning for agricultural managers and their technologist advisors (Bawden, 1984). According to Bawden systems approach is the combination of theory and action leading into praxis. The approach provides an entry point into any problem situation where the concern is focused on social and natural systems. The researcher is expected to help people in the situation make meaningful improvements rather than simply presenting them with a list of recommendations for action (Bawden, 1984). According to Kast and Rosenzweig (1970), the systems approach provides an integrative framework for an organisation and management. This includes concepts for integrating knowledge in the physical, biological, and social sciences (Kast and Rosenzweig, 1970).

To fulfil the requirements of the institution as well as acquire knowledge and competency during my research project I have selected the development of the pumpkin industry in Tonga as my research project for these reasons:

1) As an industry involved with smallholder farmers, it is imperative to find out the concerns and problems encountered with their role as producers, and to discuss some desirable solutions to improve those problems. Improving
quality and productivity in the production stage will assure the market and give high returns to growers.

2) Because the economic impact of the pumpkin industry is crucially important to the balance of payment and Tonga's trade deficit, it is vital to explore the problems concerned with the main parties involved in the industry as happened in the industry crisis in 1991. Improving these problems will increase the industry's profitability.

3) It is important to ensure that the viability and profitability of the industry is maintained, and to enable the borrowers to repay their loans to the Tonga Development Bank. At the same time the bank can continue its financial assistance for the agricultural development in Tonga.

Aim and Scope of the Research

It is the primary aim of this thesis to explore the problems and concerns of all parties involved in the development of the pumpkin industry and to identify what needs to be done to develop the industry's capacity to meet with the niche market needs efficiently and economically.

This thesis attempts also to explore the opportunities and weaknesses in the market niche and to discuss and formulate a competitive strategy for the development of the industry against its competitors.
As a newly developed industry, the study was restricted to the main island of Tongatapu. Tongatapu is the main centre for commerce and trade with its overseas partners. About ninety-five per cent of total export market share is supplied by pumpkin growers in this island.

Methodology

This topic calls for an approach which would integrate all parties involved in the development of the pumpkin industry to participate in a collaborative discussion in order to identify the problems and issues and to formulate a competitive strategy to improve the industry's activities.

There were two methods applied in the research process. The first is the Action research approach aiming to improve the understanding and practices of the people involved in the development of the industry. The second approach was applied is a niche market analysis aiming to explore the niche market situation of the industry in terms of its strengths, weaknesses, opportunities and threats.

To understand the components of my research project, I utilised the systems approach as a tool to help me understand the complexity and diversity of the situation involving the industry and its niche market. The systems approach involves taking a holistic view of a situation and observing the
inner relationships between the smaller components (Bawden, 1989a).

In this case, it meant viewing the concerns and problematic situations of the human activities in the development of the pumpkin industry, with an awareness of their roles in the social and cultural system in a wider environment (Bawden and Macadam, 1991). In dealing with a real life situation involving human beings, where each has different perceptions and understandings, the quest for an appropriate paradigm is crucial. Action Research is considered an appropriate approach to facilitate the process of research about the development of the industry.

Regarding the industry's niche market, a collaborative discussion concerned a niche market situation analysis approach is considered appropriate to bring the understanding of the people in the industry about the behaviour of the market place and its complex environment so that the exporters may be able to make a better marketing decision.

(a) What is Action Research?

Action research is defined by Kemmis and McTaggart (1988, p.5) as,

a form of collective self-reflective inquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social and educational practices, as well as their understanding of these practices and the situations in which these practices are carried out.
According to Kemmis and McTaggart (1988), action research proceeds in a spiral of steps including planning, action and the evaluation of the result of action by a group of people.

Dicks (1993) defines action research as a methodology which has the dual aims of action and research. According to Dicks, it involves an action to bring about change in some community or organisation, and research to increase understanding on the part of the researcher, or the client, or both.

Bawden (1989b) states that action research is learning with the special intentions of achieving social action while concurrently adding to public knowledge. Meredith et al. (1989) see action research as one of the more interpretive approaches to research in which the researcher is required to become involved with the phenomenon under study.

The various definitions of action research identify the main characteristics of action research, which is basically concerned with research as a process of inquiry about a problematic situation with action to improve the situation.

Kemmis and McTaggart (1988, p.9), point out that action research is participatory, collaborative research which typically arises from the clarification of some concerns generally shared by a group. People describe their concerns, explore what others think, and probe to find what it might be possible to do. In the discussion they decide what it is that it would be feasible to work on... The group identifies a thematic concern. The thematic concern defines the substantive areas in
which the group decides to focus its improvement strategies.

A working definition of action research was endorsed by the recent International Symposium on Action Research cited by Perry and Zuber-Skeritt (1990, p.7). It is summarised as follows:

a group of people at work together involving in the cycle of planning, acting, observing, reflected on their work more deliberately and systematically than usual, and a public report of that experience such as a thesis.

According to Meredith et al. (1989) research in operations has employed a limited set of paradigms for too long and mostly emphasises the artificial and rational ends of the scales and neglect on the object reality and existential/interpretive ends, it has normally submitted high reliability and internal validity with almost no external validity. (Meredith et al 1989. p.320).

Meredith et al. (1989, p.320) further argue that 'researchers emphasise objectivity in research and thus stress predictive power, with little understanding about the real world situation.' According to these authors, it is time to expand our limited set of paradigms and consider a new research approach which are more appropriate to the researched situation. This broadening of our perspective, would contribute substantially to address the research problems we face.

To make a true contributions to both research and practice,
Bawden (1989b, p.4) states 'it is of paramount importance to enlarge the repertoire of methodologies and apply those that are most appropriate, efficient, and effective for the real situations.'

The approach of action research has always been to undertake change and improvement through an involvement in real life situations. Here the distinction is made between problems in the world and problems in the laboratory (Dicks, 1991). According to Dicks, in the laboratory the researcher has the freedom to define the problem and to control the environment. Thus the researcher can allow certain variables to effect the process under investigation and to constrain others so that they do not.

Research in a real situation has to accept whatever influences the situation under inquiry (Dicks, 1991). In this regard, action research is a paradigm appropriate to my research which deals with action and research simultaneously. The action is intended to bring about change for improvement in the people's practices in an organisation or development project and research to increase understanding of the researcher, co-researchers and other people involved.

(b) **Reason for the Use of Action Research**

Action research is an entry point to this inquiry which allows the principal researcher and co-researchers to
exchange ideas for the improvement of the practices done in the operation of industry. It also allows the research team and people involved in the industry to act in the field situation as part of the practitioners' normal field practices in industry development and at the same time the understanding of the researcher and the people involved in the operation of the industry increase.

Action research, in this context, involves a group of people collaborating in planning, acting and implementing through a participative discussion. Bawden and Macadam (1991, p.374) point out that

…it makes little or no sense to now discriminate between the researcher and the researched. The two act together in a dynamic relationship which exists only whilst they collaborate to learn about some issues or other. The system exists solely as a learning or researching system, the distinction lying in the necessity for research to be subjected to public scrutiny for both the theories generated and the practices used.

The action research methodology enables decision makers and implementors to develop a desirable plan of action in order to coordinate and cooperate in evaluating the improvement of the production and marketing activities and implementing change.

Flexibility is an important characteristic of action research (Dick, 1991). It allows the research team to re-plan during the course of inquiry in order to effectively carry out the process of the action research. At the same time action
research offers such people an opportunity to make more use of their practices while researching and to learn consciously from their experience.

Utilising the concept of action research could also allow the group's leaders to participate and co-operate in planning and to formulate a strategy to execute the plan made. This would improve the overall development of the industry. Action research is also relevant for the various groups in the industry to view the industry as a system and each group acting as a sub-system. This approach would enable the people involved in the industry to understand their practices in the system and its socioeconomic and cultural environment.

It is also important to realise that action research allows the conventional research approach to be incorporated whenever it is appropriate. This is particularly important with technical problems such as soil nutrient deficiencies and diseases, which, as natural science problems, need to be addressed by an experimental designed methodology.

(c) Niche market analysis

One major aspect of this research was an analysis of the niche market situation in relation to the position of Tongan pumpkins at the market. This niche market situation analysis was based on the identification of the market place and its market environments (such as the political, demographic and
economics environments). The approach to this market analysis was conducted through the S.W.O.T. analysis approach which allowed the author to analyse the strength, weaknesses of the market niche and its environment, and the opportunities and threats of the niche market to the development of pumpkin industry. The S.W.O.T. analysis was based on the literature search about the Japanese pumpkin market and the potential competitors for the niche market.

**Fieldwork and the Research Process**

(a) *When the Research was Conducted*

The process of inquiry was carried out during the operation of the pumpkin season in 1992. A full cycle of production and marketing activities were carried out in this period.

As a short term crop, the pumpkin season usually starts in July and finishes early in December. The pumpkin season refers to the period of planting to marketing. However, credit arrangement and land preparation are started earlier during the year. The field work was planned to fit in with the field activities done by pumpkin growers and exporters such as planting of pumpkin plots, field management practices and
marketing activities. Thus, my field work was conducted whilst the growers and the people involved played their respective roles in the operation of the industry.

During the course of the inquiry I consulted with some group representatives including the export companies government departments, Bank Officers and farmer groups. Using an action research approach I conducted the research with a small team of people invited from various groups involved in the industry development. This group became a co-research team who shared the same concerns and participated in action and research to bring about change and improvement in individual practice. It was intended to increase the understanding on the part of the researcher and those who actually involved in researching, and later to all people involved in the industry.

(b) **Commencement of Field Work**

The field work was started with the introduction of my research project to some of the leaders involved in the industry. This includes the Tonga Development Bank, government departments, export companies and farmer groups. The introduction emphasised the aim of my research as well as the concept of action research as it is new to most people in the industry.
(c) Formation of Co-Research Team

Following introductory discussions I invited General Managers of export companies, representatives from the Tonga Development Bank, Ministry of Agriculture and Forestry and farmer groups to join the action research team. The prime purpose of the formation of the co-research team in the action research approach was to facilitate and advise the principal researcher about the real problems and issues concerning the development of the industry. In addition, collaboration as members of a co-research team allows the individual members to exchange views and experiences with the other members which may improve their understanding and practices in the development of the industry. Through their respective roles played in the operation of the industry, this understanding can be generated to the other people in the industry.

It was impossible to invite all the participants in the industry, particularly the large numbers of pumpkin growers and exporters, to participate as co-researchers. Thus, the research team was formed to act as representatives and to bring the concerns of their respective groups for discussion. The team members also implemented the action plan through their respective groups of farmers.

Because the main concern of all parties involved in the industry is the quality standard of the pumpkins, it was
important to invite people who are directly involved with the production and marketing development of the industry. These are the people who own the problems and concerns regarding the industry. It was also important to recognise the concerns of the government and the Tonga Development Bank who play an important role in the development of the industry. Thus the heads of various divisions of the Ministry of Agriculture and Forestry as well as a Senior officer of the Bank were invited as the members of co-research to express their views concerning the development of the industry.

(d) The Members of Co-Research Team

The co-research team consisted of eleven permanent members as well as some visiting members. The co-research team members were:

i) Exporting Company

* Managing Director of Tonga Investment Corporation and Primary Produce Company Limited, Lisiate 'Akolo.

* Managing Director of Island Produce Corporation, Steve Edward.

ii) Farmers Association

* Marketing & Communication Officer, Tupou Young Farmers Association, Sitiveni Takaetali Finau.

iii) Tonga Development Bank

* Deputy Director and Head of Lending, Tonga Development Bank, Simione Sefanaia.

iv) Ministry of Agriculture and Forestry
PLATE 1

The discussion of the Action Research Team

PLATE 2
* Deputy Director & Head of Research Division, 'Ofa Fakalata.
* Deputy Director & Head of pumpkin diseases research programmes, Tevita Holo.
* Head of Planning Division, 'Aleki Sisifa,
* Head of Quarantine, Quality and Management Division, Konrad Engleberger.
* Deputy Head of Quarantine, Quality and Management Division, Sione Foliaki.
* Head of Extension Division, Sulunga Lavaka.
* Head of Farm Machinery Services, 'Otenili Tu'ipulotu.

There were other visiting members invited during the research meetings as technical advisers in their respective specialised fields. For example a soil scientist was invited to advise the research team during the discussion about possible ways to address the problems of low soil fertility.

(e) Research Activities

After the formation of the action research team, the members agreed to have four research meetings during the pumpkin season. There was one research meeting each month from August to November during the operation of production and marketing activities.

The research team advised the principal researcher to carry out an inquiry through informal interviews of the
Discussion with the Extension Officers as part of Action Research Process

Village level meeting held as part of Action Research Process
General Managers of those export companies who were not represented on the research team. Also included in the interviews were government officials and small groups of farmers and individual pumpkin growers. The main purpose of the informal interviews was to explore the problems and concerns of the interviewees, as well as their views about further improvement of the industry's development. The findings were presented for analysis by the research team at each research meeting.

The tasks of the co-research team was proposed by the researcher and endorsed by the members of the research team at the first research meeting as the following:

1. To advise the principal researcher on the implementation of the inquiry.
2. To identify and analyse the problems perceived by the growers and other people involved in the industry.
3. To discuss possible solutions to address the problems.
4. To formulate a strategy to be implemented for the development of the industry.
5. To formulate and suggest policy guidelines to the government to improve the agricultural export policy.

(f) Data Collection

The raw data were collected through various methods such as informal interviews and small farmers' group meetings at
village level. Some raw data were recorded through participant observation in various meetings and activities practiced by the growers and exporters, as well as dialogue with people interested in the development of the industry. Data recorded from the deliberation of the research team's research meetings were also collected.

There were 100 individual farmers interviewed from four random stratified samples based on the range of acreage planted. The categories were 2–4 acres, 5–7 acres, 8–10 acres and more than 10 acres.

Secondary data and information were collected from various sources, particularly from the Tonga Development Bank and the Ministry of Agriculture and Forests as well as the Representative office of the Japan External Trade Organisation (JETRO). Unfortunately no statistical data is available from the export companies apart from the interviews of the General Managers.

In the process of collecting the data, the principal researcher explored the problems and concerns of some farmers as well as exporters. Because the members of the research team are involved with decision making and implementing the operation of the industry, the outcomes of the collaborative discussion were generated through each member of the team to their respective groups of farmers. In addition, each member of the team had authority and
experience to contribute during the process of the action research.

Because all members of the research team are decision makers in various aspects of the industry (such as research, extension services, marketing, quality control, land preparation, field operation and input supplies), it was not difficult for them to agree to a plan of action for improving the operation of the industry.

As the result of the 1991 industry crisis, the research team agreed that the 'quality standard' is the main issue which has to be addressed in order to secure the fragile niche market for the industry. It was obvious during field work that the quality standard issue was not generally recognised by farmers or exporters as the most important element of the pumpkin exports.

Due to this concern, the research team mainly concentrated their discussions on problems and issues involving the production process and ways to improve problems such as the farmers' management practices, technology generation and the support services required by the farmers. In addition, the research team discussed the issues involving the marketing chain, especially the packing houses and their facilities.

It was found that the concept of marketing has not been applied by some exporters as this concept has only recently
been introduced to agricultural export industries in developing countries including Tonga. In the marketing concept, the marketing company focuses its production development and marketing decisions on what the customers want (to satisfy the consumers need) rather than concentrating in product development and trying later to pursue the customers to buy that product. The marketing and marketing management aspects of the industry were not discussed in detail by the research team. However, with the help of a literature study and advice from one of my supervisors, I was able to present, to the team, the concepts of marketing and marketing management in relation the niche market and marketing of the industry.

The nature of the niche market and its environment was poorly understood by many exporters and almost no farmers or other parties involved in the operation of the industry had a good understanding of this area.

With the limited knowledge about the nature of the Japanese pumpkin market and its environment, the research team did not discuss in detail issues regarding the threats and weaknesses involved in the development of the niche market. However, I collected information from the Tonga Development Bank and the representative office of the JETRO which enabled me to examine the issues which should be considered by the exporters and decision makers prior to the export of pumpkins to Japan.
(g) Data Analysis

The emphasis of the inquiry was on situation improvement, leading to a further strategy formulation about the overall development of the pumpkin industry, particularly in production and marketing. Most of the data collected were qualitative.

The data were analysed through the discussion, critique and reflection of the research team. This analysis was done through a collaborative discussion of the outcomes of action practiced by all parties involved in the industry.

The generation of the plan of action to be implemented by the farmers was dependent on the authority and influence of each member of the team in the industry. The exporters generated the action plan through regular meetings with their farmers' groups, while the team members from the Ministry of Agriculture and Forestry informed the farmers through farmers' training programs. In addition, the researcher participated in groups discussions at village level as well as visits to individual farmers. Discussion with farmers were concerned with possible improvements to the farmers' practices so that they can produce quality standard pumpkins.
The Structure of the Thesis

The thesis is organised into seven chapters starting with the introduction including the rationale of the concept of the thesis and methodology applied to explore and achieve the concept of the thesis. In chapter two, the researcher tries to understand the process of economic development in Tonga in general and of the agricultural sector in particular.

In chapter three, there is an overview of the development of the industry since its inception in 1987. Chapter four focuses on the analysis of the Japan pumpkin market and its environment with the identification of the market niche for Tongan pumpkins and its potential competitors.

Based on an understanding of the situation of the industry and its environment and the niche market and its environment, chapter five focuses on the concept of marketing and marketing management in relation to the development of the industry. The theory and characteristics of niche marketing are also discussed. Some strategic marketing issues, which affect the niche market development in the industry are raised for further improvement of the export marketing of the industry.

Chapter six discusses the problems identified by the research team and improvements made during the operation in the 1992 season. The team identified some strategic issues for
further improvement of the industry and these will also be discussed.

The final chapter contains a strategic plan for further development of the industry as well as the conclusions of the research.
CHAPTER 2

ECONOMIC DEVELOPMENT AND AGRICULTURE IN TONGA

Physical Environment

(a) Geographical Setting

The Kingdom of Tonga is situated in the south east Pacific Ocean. The archipelago consists of 169 islands scattered over 360,000 sq km of ocean (FAO, 1982; World Bank, 1990). It is situated between 15 to 23.5 degrees south latitude and 173 to 177 degree west longitude (Thaman, 1975; World Bank, 1990). The islands, of which thirty-six are presently inhabited, range in size from small islets to the largest island of Tongatapu with an area of 257 sq. km, where the capital city, Nuku'alofa is situated (Thaman, 1975; FAO, 1982; World Bank, 1990).

(b) Geological Setting

Tongan islands are derived from two sources having either volcanic and coral origin (Thaman, 1975; FAO, 1982; Widdowson, 1992; Orbell, 1992). According to Orbell (1992), the western islands chain, including Tofua, Kao and Fonualei, were of volcanic origin, and the eastern islands, including Tongatapu, 'Eua in the south, through the Ha'apai group to Vana'u group in the north, were formed by raised
coral and covered with volcanic ash blown from the western volcanic islands.

(c) Soils

Soil is one of the three most important resources of the Kingdom of Tonga along with its people and the ocean. Orbell (1992) reported that poor soils have been experienced in most tropical areas, but in Tonga the soil is of a superior quality for cultivation.

The most widespread and important soils are derived from fine grained andesitic ash deposited over coral rock (Potter, 1976; FAO, 1982; Widdowson, 1992; Orbell, 1992). According to Orbell (1992) and Widdowson (1992) these soils are enriched with excellent physical properties. Orbell (1992, p.25) reports that

they are friable, well structured, well drained soils with moderate available moisture. These combined factors show that the soils are versatile and capable of maintaining production of a wide range of crops.

This study concentrated on the main island of Tongatapu. On this island, there are two distinct layers of andesitic ash (Thaman, 1975; FAO, 1982; World Bank, 1990; Orbell 1992; Widdowson, 1992). The volcanic ash weathered under the subtropical environment to form fertile soils (Orbell, 1992). Most of the soils are suitable for cultivation.
(d) Climate

The island of Tongatapu is situated barely within the tropics, almost on the Tropic of Capricorn. According to Thaman (1975) the island is under the influence of the maritime tropical air, the tradewind belt. Although the Tongan islands lie within the tropics, certain aspects of the climate in the main groups including Tongatapu, Ha'apai and Vava'u, tend towards the subtropical (Thaman, 1975; World Bank, 1990).

The following climatic description is based primarily on data from the government meteorological station in Tongatapu (Statistics Dept., 1990). Tongatapu has a mean annual temperature of 23 degree celsius with diurnal and seasonal variation. Tongans acknowledge a warm season starting November to April and cold season from May to October including the pumpkin growing season.

The prevailing winds are the trade winds which blow from the east and southeast. During the period May to November the winds blow mainly from east south east, but in the cyclone season, from late November to April the winds usually blow from the east.

Seasonality in Tonga, as in other tropical areas, is based more on rainfall than on temperature differences (Thaman, 1975). Table 1 presents the rainfall distribution in the main island of Tongatapu where the field research was held.
Agricultural production in Tonga depends entirely on rainfall. Table 1 shows that the rainfall is fairly well distributed throughout the year. However, the highest rainfall season is December to July. Generally, Tongatapu where most of the pumpkins are grown, experienced lower monthly and annual rainfall compared to Vava'u, the second largest island group in the north.

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Total: 1363 1269 901 1761 2163

Average (Monthly): (113.58) (105.75) (75.08) (146.75) (180.25)


It should be noted that Tongatapu experienced a prolonged drought which has indicated by the lowest monthly average and annual rainfall of 75.08 mm and 901 mm respectively in 1987. This was the year of the first attempt to grow pumpkins for export to Japan.
For the pumpkin season planting usually starts in late July and finishes at the end of August. The monthly rainfall gradually declines during that period, which is the growth period for the pumpkins. However, the market niche period is between November and January and, therefore, pumpkins must be grown in this drier period of the year and the farmers have to irrigate or deliver water if there is no rain during the growing season.

Resources

(a) Land Tenure

The Kingdom's Constitution of 1875 defines all land as the property of the Crown (Clifford, 1929; Thaman, 1975). This was further endorsed by the Land Act of 1927 (Thaman, 1975) as all land in Tonga is ultimately the property of the crown and divided into three main categories. These are the King's hereditary estates, the hereditary estates of the nobles and government or crown land. The two last categories are subdivided into allotments under the law to provide bush and town allotments to the commoners.

According to Clifford (1929) and Thaman (1975), the right to tenure and the system of inheritance are provided for in the Land Act of 1927 in which all holders of hereditary estates are appointed by the ruling monarch who may grant new estates from government land when he finds it necessary.
Under the Constitutional system each male Tongan reaching the age of sixteen is entitled to apply for town and tax allotments with an area not exceeding 0.25 and 8 acres respectively. Both the government and nobles land subdivided are not held as part of hereditary allotment by the commoner until that plot of land is officially registered in the Ministry of Land, Survey and Natural Resources. The town and tax allotments then becomes a hereditary town or bush allotment of the holder's lineal descendants but cannot be sold. However, it can be leased. Due to population growth and resulting pressure on land, this land entitlement to commoners has not been fully honoured due to the shortage of land which is a major constraint resulting in a reduction in plot size.

Land in Tonga is held in a number of different forms. The most important are the tax and town allotments and leases (Table 2). Tax allotment refers to the land owned by the Tongan household for farming, and town allotment refers to land for settlement in villages. The leaseholders refer to the land under lease from any of the three main categories above.

Table 3 presents the total land area of Tonga and how it has been distributed. It shows that 62 percent or 114,520
### Table 2: DISTRIBUTION OF LAND HOLDINGS 1985-1989 (Numbers)

<table>
<thead>
<tr>
<th>Year</th>
<th>TAX ALLOTMENTS</th>
<th>TOWN ALLOTMENTS</th>
<th>LEASE HOLDERS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>14,532</td>
<td>10,246</td>
<td>2,454</td>
<td>27,232</td>
</tr>
<tr>
<td>1986</td>
<td>14,601</td>
<td>10,382</td>
<td>2,656</td>
<td>27,639</td>
</tr>
<tr>
<td>1987</td>
<td>14,889</td>
<td>10,521</td>
<td>2,804</td>
<td>28,014</td>
</tr>
<tr>
<td>1988</td>
<td>14,760</td>
<td>10,710</td>
<td>2,971</td>
<td>28,441</td>
</tr>
<tr>
<td>1989</td>
<td>14,863</td>
<td>11,028</td>
<td>3,064</td>
<td>28,955</td>
</tr>
</tbody>
</table>


### Table 3: LAND AREA AND ITS USE (ACRES)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL LAND AREA</td>
<td>184,675</td>
<td>184,675</td>
<td>184,675</td>
<td>184,675</td>
<td>184,675</td>
</tr>
</tbody>
</table>

Registered tax & town allotments 80,418 80,776 81,231 81,741 82,523
Land allocated but not yet registered. 35,536 35,046 34,237 33,029 31,997
Land allocated to hereditary Nobles 12,824 12,824 12,824 12,824 12,824
Land leased 15,465 16,706 15,952 16,648 16,899
Government land 40,421 40,421 40,421 40,421 40,421

acres of the total land area has distributed to Tongans for settlement and cultivation. Despite the shortage of land to honour the land tenure system, there are many tax allotments which have not been cultivated or placed under bush fallow.

According to the outcome of the Annual Crops Survey of Tonga carried out from November 1991 to March 1992 (MAF, 1992a), only 36 per cent of the Kingdom's 38,308 acres managed area was cropped. In Tongatapu, only 35 per cent of the managed area was cropped. Managed area refers to the area of tax allotments suitable for cultivation. However, the survey result can be disputed as vegetable and pumpkin areas were not included because they were harvested before the survey period. The pumpkin growing area in 1991 was 3,256 acres.

(b) Tongan Society

Tongan society is a stratified hierarchy, with the royal family and the nobles at the top of the scale, and the common people at the bottom (Clifford, 1929). According to Clifford and Thaman (1975) the Tongans recognise four general classes including the King (Royal family), the nobles, the chief attendants and common people.

These traditional classes are the fundamental social structure of Tongan society which the present generations recognise and respect, at least to some degree. Each class
has its own characteristic roles to play in Tongan society. Due to the traditional taboos, interaction between the commoners and the Royal family and the nobles is very limited.

The kinship ties in the Tongan society provide the basis for social activities (Thaman, 1975). This is important, particularly for the supply of goods and services within the household and extended family. Although the goods and services are distributed within the extended family, the household is considered more important than the extended family with respect to land tenure and economic activities such as growing pumpkins.

The political system is a constitutional monarchy consisting of the King, a Cabinet, Privy Council and a Parliament. It is a one party system controlled by the King although the common people select nine people's representatives. The King chooses the Prime Minister and all Ministers as well as two Governors.

The Tongan people are settled in a village system. The village system is the foundation of the Tongan society in which each household has a town allotment for settlement. Each village is within a noble's, the King's or government land. The people have to elect a political leader as their representative on government support services as well as law and order, both at the village and at the district level.
Because Tongans are very strong in christian belief, the religious groups are considered more socially important than the government at the village level. The social focus of villages is on church activities such as prayer meetings and youth clubs as well as women's communal development groups. Pastors, educators, and successful farmers and businessmen are respected and their status and prestige are recognised by the village people. The successful people in the village are the backbone for the socio-economic development of the village. Communal working groups are also formed by the smallholder farmers for agricultural production activities such as planting and field management of crops.

The impact of Tongan social structure on agricultural development occurs through the obligations of kinship ties and religious belief of the people. According to Thaman (1975), kinship ties provide a major impetus for the redistribution of agricultural products within the village. The most noticeable exchanges are those which take place during ceremonial occasions such as marriages and funerals.

Another impact of social activities is that different households and extended families contribute labour and food or make presentations of traditional handicrafts to the social activities. Apart from ceremonial exchanges there is also a constant flow of labour, food and other commodities throughout the kin groups.
The household farming system forms part of the wider social system, in which foods and other commodities are the major form of ceremonial exchange and achieve emotional and social importance within the society (Thaman 1975).

Because of the stratified hierarchical system and under traditional monarchic rule, the distribution of land is not equitable. This results in inequality in living standards between households in the villages. It has been recognised by the commoners that the land tenure system is the major obstacle to economic development in general and to agricultural development in particular. There is no real poverty or hunger, because the people can help each other as well as being self-sufficient in staple foodcrops. However, economic pressure is a problem as the majority of households rely on their income from agriculture.

(c) Population

According to Census data (Statistics Department, 1986), the Kingdom's population in 1986 was 94,535, and had undergone an average annual growth of 0.49 percent during the 1956-86 period.

Tonga's Sixth Development Plan (CPD, 1992) reported that about 20,000 persons emigrated during the 1976-86 period. These people migrated mainly to New Zealand, Australia and the United States and they have become a potential ethnic export market for traditional rootcrops such as taro, yam
and cassava produced by Tongan farmers.

Table 4 reveals that 40.6 percent of the population was below the age of fifteen during the 1986 census. This is a decline of 3.9 percent from the 1976 census, mainly due to migration overseas.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number ('000)</th>
<th>Percent</th>
<th>Number ('000)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>40.0</td>
<td>44.5</td>
<td>38.5</td>
<td>40.6</td>
</tr>
<tr>
<td>15-64</td>
<td>47.0</td>
<td>52.2</td>
<td>52.2</td>
<td>55.2</td>
</tr>
<tr>
<td>65+</td>
<td>3.0</td>
<td>3.3</td>
<td>4.0</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>90.0</td>
<td>100.0</td>
<td>94.7</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Central Planning Dept., 1992. DP V1 p.63;

The pattern of internal migration over the 1976-1986 period indicates that only the main island of Tongatapu had a net migration gain, while all other island groups had suffered net emigration (Statistics Dept., 1991)

(1) Labour Force

The size and growth of the labour force is shown in Table 5. About 56 per cent of the population is in the working age group, but only 25.5 percent is in the work force. This
is mainly due to the low level of formal economic activity of women in the working age group which amounts to only 17.7 per cent of the total work force. Women are engaged mainly in household activities such as childcare, cooking and preparing handicrafts for social obligations which are not recognised as economic activities.


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>46,036</td>
<td>44,049</td>
<td>47,611</td>
<td>47,038</td>
</tr>
<tr>
<td>Population of working age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(15-64)</td>
<td>23,713</td>
<td>23,360</td>
<td>25,751</td>
<td>26,455</td>
</tr>
<tr>
<td>Labour force (+15):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>18,077</td>
<td>3,358</td>
<td>19,119</td>
<td>5,055</td>
</tr>
<tr>
<td>Unemployed</td>
<td>15,833</td>
<td>2,743</td>
<td>17,886</td>
<td>4,109</td>
</tr>
<tr>
<td></td>
<td>2,194</td>
<td>615</td>
<td>1,233</td>
<td>946</td>
</tr>
</tbody>
</table>

Source: Central Planning Dept. 1991, DP V1 p.66.

According to the population census in 1986 (CPD, 1991), 50 per cent of the labour force are engaged in activities related to agriculture reflecting the fact that agriculture is the predominant sector for employment and economic development. Next in the order of important is the Services sector employing 16.7 per cent of females and 53.3 per cent of males.

(d) Capital Resources
Capital resources such as education, credit and infrastructure are essential for agricultural development.

(i) Education.

The broad aims of the education system outlined in the Tonga Sixth Development Plan (CPD, 1991, p.287) are:

To continue to improve the standards and quality of education at the primary, secondary and tertiary levels.

To develop Tonga's human resources to meet the country's manpower needs to achieve continuous national development and growth.

To promote understanding and respect of people's physical and cultural environment.

According to the Sixth Development Plan, education in Tonga aims to expand training and scholarship programs to meet Tonga's increasing demands for skilled manpower.

Agricultural education in Tonga starts from primary school level. Agricultural subjects are taught in secondary schools. Apart from this, some church denominations have established agricultural colleges for school leavers who are interested in agricultural training. These colleges teach basic farming techniques both in theory and practice. An agricultural certificate and/or a diploma is offered to a student who successfully completes the course.

Tertiary agricultural education has to be pursued overseas in colleges and universities mainly in the South Pacific.
region including New Zealand and Australia. Diploma and degree graduates are now holding responsible positions both in administration and technical aspects of agricultural development in the Kingdom. The training of farmers is also carried out by the Ministry of Agriculture and Forestry.

(ii) Financial Institutions.

There are three financial institutions in the Kingdom established to serve government development policies and the financial needs of the people of Tonga.

(1) National Reserve Bank of Tonga (NRBT)

The principal roles of the NRBT are to regulate the issue of currency and international exchange of money, to promote monetary stability and a sound financial structure and to induce credit and exchange rate conditions allowing balanced economic growth in the Kingdom (CPD, 1991). It also controls a source of internal funds which are made available for loan by the Tonga Development Bank for agricultural development.

(2) Bank of Tonga.

The Bank of Tonga is the only commercial bank in the Kingdom. The services and facilities offered by the
Bank include cheque and saving accounts, term deposits, development and personal loans, overdraft facilities, Visa and Mastercard facilities and foreign exchange.

During the 1989-90 financial year the Bank disbursed T$38 million for personal and developmental requirements of the people including some agricultural loans (CPD, 1991).

(3) Tonga Development Bank

The Tonga Development Bank (TDB) was established to contribute to the expansion of the economy for the benefit of the people by providing financial and advisory assistance to enterprises operating or prepared to operate in the Kingdom. This institution is controlled by the government, with 90 percent of shares and the Bank of Tonga with 10 percent.

Table 6 displays the allocation of credits by the Tonga as well as the primary sector. Development Bank to various sectors in the non-primary sector

In 1991 the bank approved loans to a total value of T$13,884,500 of which T$10,096,280 or 72.7 percent of total loaned value was allocated for the agricultural development (TDB, 1992).
### Table 6: TDB Loan Approval by Sector (1986-1990)

<table>
<thead>
<tr>
<th>Sectors</th>
<th>T$'000</th>
<th>% sub total</th>
<th>% total approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing &amp; Processing</td>
<td>2,934</td>
<td>13.5</td>
<td>7.1</td>
</tr>
<tr>
<td>Mining &amp; Quarrying</td>
<td>739</td>
<td>3.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Electricity &amp; Gas</td>
<td>407</td>
<td>1.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Contraction</td>
<td>1,032</td>
<td>4.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Wholesale &amp; Retail</td>
<td>4,644</td>
<td>21.4</td>
<td>11.2</td>
</tr>
<tr>
<td>Hotels &amp; Restaurants</td>
<td>5,532</td>
<td>25.5</td>
<td>13.4</td>
</tr>
<tr>
<td>Transport</td>
<td>3,834</td>
<td>17.7</td>
<td>9.3</td>
</tr>
<tr>
<td>Finance &amp; Business</td>
<td>1,353</td>
<td>6.2</td>
<td>3.1</td>
</tr>
<tr>
<td>Community Services</td>
<td>1,243</td>
<td>5.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Sub-total non-primary sector</td>
<td>21,718</td>
<td>100</td>
<td>52.5</td>
</tr>
<tr>
<td>Beverages &amp; Spices (vanilla)</td>
<td>5,812</td>
<td>29.5</td>
<td>14.0</td>
</tr>
<tr>
<td>Bananas &amp; other fruits</td>
<td>727</td>
<td>3.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Pumpkins &amp; Vegetables</td>
<td>4,506</td>
<td>22.9</td>
<td>10.9</td>
</tr>
<tr>
<td>Rootcrops</td>
<td>4,934</td>
<td>25.1</td>
<td>11.9</td>
</tr>
<tr>
<td>Livestock</td>
<td>947</td>
<td>4.8</td>
<td>2.3</td>
</tr>
<tr>
<td>Fisheries</td>
<td>1,863</td>
<td>9.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Others</td>
<td>881</td>
<td>4.5</td>
<td>2.1</td>
</tr>
<tr>
<td><strong>Sub-total primary sector</strong></td>
<td>19,670</td>
<td>100.0</td>
<td>47.5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>41,388</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>


(iii) Infrastructure

The infrastructural resources of the agricultural sector have recently improved with the construction of new wharves and up-grade of wharf facilities. Most of the agricultural
roads in rural areas have also been improved. However, some improvements have not been carried out due to the lack of capital resources. This is indicated by the lack of an appropriate shipping services to transport agricultural produces such as pumpkins from the outer islands to the main island of Tongatapu.

Despite Tonga's isolation and remoteness from her agricultural export markets, such as the United States and Japan, modern air and sea transport coupled with computer and satellite communications have now opened up opportunities to the rest of the world (Myers, 1992).

With five airlines flying regularly and four main shipping companies in Tonga, the exporting companies have a choice of competitive carriers.

**Tongan Economy**

(a) Economic Performance

(i) Gross Domestic Product (GDP)

A study done by Unisearch Ltd. (1991) reports the overall economic performance in terms of real GDP, has grown by an annual average of 2.3 percent during 1985/86-1987/88, by 3.6 percent in 1988/89 and 2.5 percent in 1989/90. The Agricultural Sector (including Pumpkin Industry)
contributed the highest amount (more than 40%) to the GDP throughout the reported period.

(ii) Balance of Payments

According to the study done by Unisearch Ltd. (1991), Tonga's external accounts situation improved in 1990, with the balance of payments recording an overall surplus of T$6.8 million compared with the deficit of T$1.6 million in 1988/1989 fiscal year as a result of drought in 1987 which affected the agricultural exports. The improvement made in 1990 was due mainly to the foreign exchange earnings from pumpkin exports.

Table 7 presents the trends in the balance of payments in the last three development periods. The balance of payments out-turn, during the 1985-1990 period displays the same fundamental features as in the 1978-1980 and 1980-1985 development periods. The growing deficit in the balance of trade was matched by the surplus in the services and transfers account. By the end of 1989-1990, foreign reserves were sufficient to cover some six months of imports.

Table 7 further displays the structural weaknesses of Tonga's external account. This is mainly due to the fact that Tongan export markets stagnated particularly in the performance of the traditional agricultural export industries. Although, the pumpkin exports have revived the
balance of payment since 1988, there is still a need for more export markets.

<table>
<thead>
<tr>
<th>Table 7: BALANCE OF PAYMENTS 1985/86-1989/90</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Pa'anga in million)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance of trade</td>
<td>-19.3</td>
<td>-30.9</td>
<td>-47.8</td>
</tr>
<tr>
<td>Exports, fob</td>
<td>6.1</td>
<td>7.2</td>
<td>10.4</td>
</tr>
<tr>
<td>Imports, fob</td>
<td>-25.4</td>
<td>-38.1</td>
<td>-58.2</td>
</tr>
</tbody>
</table>

Source: Central Planning Dept. 1991, DP VI, p.17.

(iii) Imports

The imports increased to reach T$72.7 million in 1989-90 from T$68.8 million in 1988-89 financial year. This resulted in a further widening of the deficit on the trade account. Food stuffs were the highest import item comprising 27.8 per cent of the total imports in the 1989-90 period. The Budget Statement 1992-1993 (Ministry of Finance, 1992) reports that the imports declined by T$2.2 million or 2.8 per cent in 1991.

(b) Government Allocation of Development Expenditure

Development expenditure is aimed at further directing the economy towards the growth of the private sector through increased exports and tourism (Ministry of Finance, 1992).
Table 8 presents the allocation of development funds to various sectors including the agricultural sector. According to the Budget report (Ministry of Finance, 1992), about 36 per cent of the development funds have been provided as grants. The remainder is provided from loans, local funds and the Tonga Trust Funds.

<table>
<thead>
<tr>
<th>Description</th>
<th>1991-92</th>
<th>1992-93</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Administration</td>
<td>3,045</td>
<td>5,431</td>
</tr>
<tr>
<td>Total Social Services</td>
<td>7,161</td>
<td>8,286</td>
</tr>
<tr>
<td>Total Infrastructure</td>
<td>6,097</td>
<td>14,019</td>
</tr>
<tr>
<td>Agriculture -General</td>
<td>1,479</td>
<td>4,012</td>
</tr>
<tr>
<td>Agriculture -Livestock</td>
<td>127</td>
<td>78</td>
</tr>
<tr>
<td>Agriculture -Forestry</td>
<td>481</td>
<td>514</td>
</tr>
<tr>
<td>Fisheries</td>
<td>415</td>
<td>3,961</td>
</tr>
<tr>
<td>Manufacturing &amp; Commerce</td>
<td>426</td>
<td>3,125</td>
</tr>
<tr>
<td>Tourism</td>
<td>491</td>
<td>3,787</td>
</tr>
<tr>
<td>Electric Power Supplies</td>
<td>818</td>
<td>5,971</td>
</tr>
<tr>
<td>Public Markets</td>
<td>50</td>
<td>1,020</td>
</tr>
<tr>
<td>Miscellaneous Economic Services</td>
<td>3,230</td>
<td>9,189</td>
</tr>
<tr>
<td>Total Economic Services</td>
<td>7,517</td>
<td>31,658</td>
</tr>
<tr>
<td>TOTAL</td>
<td>23,820</td>
<td>59,395</td>
</tr>
</tbody>
</table>

Source: Ministry of Finance 1992, Budget Statement p.45

Table 8 further reveals that only 6.75 per cent of the total development funds in 1992-93 are allocated for the agriculture sector, an increase of 171 per cent from the 1991-92 financial period. This increase reflects the increasing demand by the government for further development
of the agricultural sector especially the development of the pumpkin industry. In addition, the agricultural sector has benefited from the infrastructure sector such as roads and shipping.

Tonga's Development Objectives

The national development objectives for the Sixth Development Plan approved for the 1991-1995 period (Central Planning Dept. 1991, p.1) are:

* achieve sustainable economic growth conducive to a higher per capita income
* achieve a more equitable distribution of incomes and a more equitable access to goods and services between regional community groups and between income groups;
* generate more employment opportunities;
* restore and control external financial balances;
* enhance the quality of life by raising health standards, maintaining national security and continuing to promote the cultural heritage of the Kingdom;
* develop beneficial relations with other nations; and
* ensure the continued protection and management of natural resources for sustainable development.

Agriculture Sector

Agriculture in Tonga is based on a productive smallholder farm system, supported by good soils and an almost subtropical climate (World Bank, 1990; Unisearch Ltd, 1991). Apart from a few subsistence farmers, mostly in the small outer islands, (Hardtaker et al. 1988; World Bank, 1990) most of the farmers have shifted from pure subsistence farming to semi-commercial farming. Thus, most farmers not
only meet their basic household requirements, but also supply domestic and export markets (Hardtaker et al, 1988; World Bank, 1990; Unisearch Ltd, 1991).

Much of the recent growth in the sector has been in traditional foodcrops such as taro and cassava particularly for export to an ethnic niche market among overseas Tongans (World Bank, 1990; Unisearch Ltd, 1991; Sturton, 1992). Introduced crops such as vanilla and pumpkin have also attracted more farmers to the sector.

(a) The Importance of the Agricultural Sector

The agricultural sector is the most important sector in the economy as well as the livelihood of the Tongan people. The Agricultural Census Report (Statistics Dept. 1986) reported that 70 percent of the population depend primarily upon agriculture for their food supply and the main source of income. The sector has the highest foreign exchange earnings as well as being the main contributor to the Gross Domestic Product.

The agricultural sector is also the main source of employment for Tongans (Central Planning Dept. 1991). It also contributes capital resources for the development of the non-agricultural sector through savings from revenue received from agricultural exports such as pumpkins.
(b) **The Performance of the Agriculture Sector**

The performance of agriculture can be evaluated from its two main functions: domestic production and consumption and agricultural exports and their contribution to the GDP.

(i) **Household Consumption**

Apart from imported foods such as meat and flour, the Tongan people depend on domestic production for their stable food supply. Table 9 presents the total staples in the domestic market in the main island of Tongatapu.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yam</td>
<td>215.92</td>
<td>294.62</td>
<td>313.56</td>
</tr>
<tr>
<td>Swamp taro</td>
<td>19.00</td>
<td>33.68</td>
<td>222.05</td>
</tr>
<tr>
<td>Taro tarua</td>
<td>230.11</td>
<td>493.35</td>
<td>1184.09</td>
</tr>
<tr>
<td>Sweet potato</td>
<td>399.52</td>
<td>809.79</td>
<td>1161.84</td>
</tr>
<tr>
<td>Cassava</td>
<td>740.11</td>
<td>695.37</td>
<td>389.51</td>
</tr>
<tr>
<td>Giant taro</td>
<td>112.34</td>
<td>252.94</td>
<td>196.22</td>
</tr>
<tr>
<td>Irish Potato</td>
<td>8.18</td>
<td>7.55</td>
<td>8.33</td>
</tr>
</tbody>
</table>


(ii) **Agricultural Exports**

Agricultural exports during the 1980s stagnated due to the low prices on the world market and a ban on exporting bananas and watermelons to the New Zealand market. Table 10 presents the trend of exports, clearly indicating the fall
in traditional agricultural exports. Coconut products have undergone a significant downward trend, whereas they use to be the most important commodity. The Table also reveals the marked decline in the export of bananas and watermelons as the result of quarantine restrictions from the New Zealand authorities.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>85/86</th>
<th>86/87</th>
<th>87/88</th>
<th>88/89</th>
<th>89/90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coconut products</td>
<td>3.0</td>
<td>2.9</td>
<td>1.8</td>
<td>1.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Bananas</td>
<td>1.0</td>
<td>1.7</td>
<td>0.8</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Vanilla</td>
<td>1.2</td>
<td>1.4</td>
<td>1.9</td>
<td>2.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Rootcrops</td>
<td>0.2</td>
<td>0.3</td>
<td>0.5</td>
<td>0.9</td>
<td>2.0</td>
</tr>
<tr>
<td>Watermelons</td>
<td>0.4</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other exports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Pumpkin)</td>
<td>0.9</td>
<td>1.2</td>
<td>0.6</td>
<td>1.6</td>
<td>2.9</td>
</tr>
<tr>
<td>Fish</td>
<td>0.6</td>
<td>1.2</td>
<td>1.3</td>
<td>2.1</td>
<td>1.4</td>
</tr>
<tr>
<td>Manufactured goods</td>
<td>1.0</td>
<td>1.4</td>
<td>1.9</td>
<td>3.1</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>Total Exports</strong></td>
<td><strong>8.2</strong></td>
<td><strong>10.2</strong></td>
<td><strong>8.8</strong></td>
<td><strong>12.1</strong></td>
<td><strong>11.6</strong></td>
</tr>
</tbody>
</table>


Prior to the commencement of pumpkin export industry in 1989-90, vanilla and rootcrops were the most important agricultural exports. This is obscured in Table 10 because pumpkins were categorised under 'other exports' and not separately identified until 1989-90.

The World Bank (1990) reports that agriculture contributed about 41 percent of the total GDP in recent years. The World Bank (1990) argued that there has been an
underestimation of the contribution made by agriculture to the economy. It has been realised that production for home consumption and domestic market are not properly recorded while the traditional rootcrops exported by individual farmer are under recorded.

The estimated value of agricultural production and exports was 58 percent. This was due to the value of home consumption and domestic sales as well as the ethnic niche markets which are usually neglected by the statistical analysis resulting in misrepresenting the contribution of agriculture to the economy as a whole.

**Tongan Farming System**

The Tongan multicrop, multistoried, rotational farming system with its grass/bush /forest fallows is an agroforestry system dependent on complex interactions between crops and trees (Thaman, 1975; Hardtaker et al. 1988; World Bank, 1990). According to the World Bank (1990, Annex 1 p.2) 'the productivity of its major rootcrops make it a highly robust and dynamic low-input medium output system which readily incorporated new crops and activities.'

Traditionally the farming system relies on traditional rootcrops such as yam, taro, cassava and sweet potato grown under coconut mixed with cash crops, trees and livestock
(Thaman, 1975; Hardtaker et al. 1988; World Bank, 1990). This farming system operates in small holdings ranging from 4 to 8 acres in size.

The Tongan smallholder farming system has changed markedly. The farmers have moved from supplying all household and ceremonial food through subsistence farming to market oriented farming which is known as semi-commercial farming.

The World Bank (1990) reports that the bulk of marketed agricultural production in Tonga is grown within a continually adapting farming system with the farmer planning for home as well as market production.

Although agricultural production for foodcrops and cashcrops is dominated by the smallholder farmers, there are a few relatively large scale (by local standards) commercial operations (about 30-40 acres) operated by a few Tongans (World Bank, 1990; Sturton, 1992).

The farmers have practised three types of cropping system: mixed cropping, intercropping and monocropping. The cropping system used will depend on what type of crops are planted. Usually the introduced cashcrops such as watermelon and pumpkin are planted under the monocropping system, and the traditional rootcrops are planted in a mixed or intercropping system.
The rotational-fallow-cultivation system has been commonly practised by the farmers. In this cultivation system the crops are serially rotated for about 2-4 years followed by a fallow period of about 6-12 months. Sometimes the duration of the fallow period depends on the size of land owned by the farmer. The bigger the size of land is, the longer is the fallow period.

It has been observed that the short term crops such as pumpkin, the fallow period is getting shorter and short crop rotation practised. As the fallow period is getting shorter, those farmers involved in rootcrops have so far succeeded, while those farmers involved in introduced cashcrops such as pumpkins must apply fertilisers in order to succeed.

The important feature of the rotational-fallow-cultivation system is that seasonal variations in labour requirements are relatively small and timing of planting and harvesting is not crucial.

The Tongan cropping systems are based on tropical rootcrops such as yam, taros, cassava and sweet potato (Hardtaker, 1971; FAO, 1982; World Bank, 1990; Unisearch Ltd, 1991; Sturton, 1992). These rootcrops are planted in sequence of species usually starting with yam on land cleared from fallow. Traditionally the farmer starts his rotational cropping with yam (Dioscorea alata). This is because yam
planting requires new fallowed land with high soil fertility to supply sufficient nutrients during the growth period of the yam. Yam can be mixed cropped with giant taro (Allocasia macrorrhiza) and plaintain (Musa species).

When the yams are harvested, taros (Xanthosoma or Colocasia spp.) or sweet potatoes (Ipomoea batatas) or cassava (Manihot esculenta) follows in the rotation. Sometimes the farmer rotates the yam with some introduced cashcrops such as vanilla (Vanilla fragrans) or kava (Piper methysticum) or vegetables. The crop rotation period can be continued for 3-5 consecutive years depending on the crop's maturity period before shifting to new fallowed land. It should be noted that the cropping system is commonly practiced under coconuts as well as on open land without coconuts.

Reports (Hardtaker et al. 1988; Statistics Dept. 1986; MAF, 1991) show that agricultural production for domestic consumption in Tongan agriculture is far larger than that for export. This reflects the fact that Tongan agricultural export markets are very limited.

Agricultural Land Utilisation

Table 11 presents the typical land use and pattern of cropping practices practised by Tongan farmers. The table demonstrates the Tongan cropping system under shifting
cultivation, indicating that rootcrops occupied most of the land under cropping. It also shows that the percentage of the fallowed land is much higher than the cropped land on a tax allotment basis. The data presented is based on the study done by Hardtaker et al. (1988) on smallholder production in four villages in the Kingdom of Tonga.

<table>
<thead>
<tr>
<th>Table 11: USE OF LAND OPERATED BY SURVEYED HOUSEHOLD (HH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Villages surveyed: Ha'akame Ha'ano Mataika Navutoka</td>
</tr>
<tr>
<td>Total land per HH (ha)</td>
</tr>
<tr>
<td>3.664</td>
</tr>
<tr>
<td>2.190</td>
</tr>
<tr>
<td>4.740</td>
</tr>
<tr>
<td>4.822</td>
</tr>
<tr>
<td>Total land use:</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>Land cropped by HH</td>
</tr>
<tr>
<td>35.04</td>
</tr>
<tr>
<td>35.14</td>
</tr>
<tr>
<td>25.54</td>
</tr>
<tr>
<td>20.97</td>
</tr>
<tr>
<td>Fallow land</td>
</tr>
<tr>
<td>64.96</td>
</tr>
<tr>
<td>64.86</td>
</tr>
<tr>
<td>74.46</td>
</tr>
<tr>
<td>79.03</td>
</tr>
<tr>
<td>Total land</td>
</tr>
<tr>
<td>100.00</td>
</tr>
<tr>
<td>100.00</td>
</tr>
<tr>
<td>100.00</td>
</tr>
<tr>
<td>100.00</td>
</tr>
<tr>
<td>Used cropped land:</td>
</tr>
<tr>
<td>Rootcrops</td>
</tr>
<tr>
<td>63.01</td>
</tr>
<tr>
<td>63.70</td>
</tr>
<tr>
<td>24.77</td>
</tr>
<tr>
<td>58.13</td>
</tr>
<tr>
<td>Rootcrops mixed</td>
</tr>
<tr>
<td>36.99</td>
</tr>
<tr>
<td>36.30</td>
</tr>
<tr>
<td>75.23</td>
</tr>
<tr>
<td>41.87</td>
</tr>
<tr>
<td>Cash crops</td>
</tr>
<tr>
<td>100.00</td>
</tr>
<tr>
<td>100.00</td>
</tr>
<tr>
<td>100.00</td>
</tr>
<tr>
<td>100.00</td>
</tr>
</tbody>
</table>

According to a recent Annual Cropping Survey (MAF, 1992a), the total farmed area during the survey period (4 months) was 12,684 acres, or 36 percent of the Kingdom's 35,308 acres managed area. Managed area refers to the land managed for cultivation. This indicates that there is an land available in the Kingdom for further agricultural development, especially in Tongatapu.
(a) Size of Agricultural Holdings

According to the agricultural census (Statistics Dept. 1986) the majority of tax allotment holders (76 percent) have land area less than 8 acres (Table 12).

<table>
<thead>
<tr>
<th>AREA</th>
<th>HOUSEHOLDS</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 8 acres</td>
<td>7,751</td>
<td>76</td>
</tr>
<tr>
<td>9-16</td>
<td>1,276</td>
<td>12</td>
</tr>
<tr>
<td>17-20</td>
<td>684</td>
<td>7</td>
</tr>
<tr>
<td>More than 21 acres</td>
<td>493</td>
<td>5</td>
</tr>
</tbody>
</table>


The annual crop survey (MAF, 1992a) reports that the average area cropped per farmer was 2.3 acres. This demonstrates that Tongan agriculture is dominated by smallholder production. Table 13 presents the distribution of cropped acreage per farmer by island group. About 55 percent of Tonga's active farmers grew less than two acres of crops during the survey period.

It should be noted that the survey period was conducted during the off season period of vegetables and pumpkin growing therefore the cropped land areas for these crops (more than 4,000 acres of pumpkins in 1991) were excluded from the survey.
Table 13: DISTRIBUTION OF CROPPED ACREAGE PER FARMER BY ISLAND GROUPS

<table>
<thead>
<tr>
<th>Island Group</th>
<th>0-2</th>
<th>&gt;2-4</th>
<th>&gt;4-5</th>
<th>&gt;5-8</th>
<th>&gt;8-&lt;11</th>
<th>&gt;11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tongatapu</td>
<td>1104</td>
<td>838</td>
<td>212</td>
<td>231</td>
<td>69</td>
<td>20</td>
</tr>
<tr>
<td>Vava'u</td>
<td>796</td>
<td>348</td>
<td>71</td>
<td>131</td>
<td>39</td>
<td>36</td>
</tr>
<tr>
<td>Ha'apai</td>
<td>799</td>
<td>175</td>
<td>19</td>
<td>27</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>'Eua</td>
<td>184</td>
<td>113</td>
<td>21</td>
<td>20</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Niua Tt</td>
<td>111</td>
<td>26</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3014</td>
<td>1500</td>
<td>326</td>
<td>411</td>
<td>128</td>
<td>63</td>
</tr>
</tbody>
</table>


Organisation of Agriculture

The Organisation of Agriculture in Tonga involves both the public and the private sector. The private sector is the implementor while the public sector offers the support services to facilitate the implementation of agricultural production. The support role extends from production to marketing. Although the farmer has to choose what he has to produce for what purpose, the government, through the Ministry of Agriculture and Forestry, is responsible for advising farmers on agricultural enterprises deemed suitable for the farmers.

The Ministry of Agriculture and Forestry is primarily
responsible for the formulation and implementation of government policies. Land tenure and issues concerned with it, are the responsibility of the Ministry of Lands, Survey and Natural Resources. Export marketing is controlled by the Ministry of Labour, Commerce and Small Industries. The Central Planning Department has the overall responsibility for the coordination of planning and project monitoring under foreign aid to ensure that agricultural policies, programs and projects are consistent with national development objectives.

The Tonga Development Bank has been established as the major source for agricultural credit. The major agricultural projects such as pumpkins, vanilla, rootcrops and vegetables are financed by the Bank both in the areas of production and marketing. The agricultural input supply is run by the private sector.

The domestic market for agricultural products is well established for Tongatapu and Vava'u, controlled by a government market committee. The local fresh produce market is largely unregulated and commodity prices are determined by fluctuations of supply and demand. The export of most agricultural commodities is regulated by the government through issuing of export licences to exporters. The export of rootcrops is done mainly by individuals.
The Role of Farm Family Management

Farming in Tonga is a family activity, which means that decisions about the management of the farm are closely linked with household decisions on what to plant for food, social obligations and income as well as how to spend the time in each activity.

The typical unit of production is a household family comprising a man, his wife and their children and other relatives. This is known as the extended family which may live under one or two houses in one town allotment, but all members generally share the same meal and household facilities. The labour force is mainly made up of family members, although some work may be done by casual hired labourers.

(a) Household Labour Use

Traditionally, the division of labour in Tongan society was clearly defined. For example, the females were responsible for household duties at home such as child-care, cooking and cleaning as well as preparing handicrafts. The men were responsible for farming or seek for off-farm employment to get food and income for the family.

Due to the pressures of population growth and economic needs of the households, the barrier of the division of
labour has become much less relevant as many females are involved in both farming and employment like their male counterparts. Hardtaker et al. (1988) report that the time of most adults, both male and female, is reasonably fully occupied in production.

According to Hardtaker et al. (1988) people between the ages of 15 and 50 did more than 50 hours of work per week, and both men and women in the middle years (25-44), average more than 60 hours per week on productive activities. However, the study further reports that women spend less time than men on production and are less involved in wage employment where as most of their time is spent on household activities. The men mostly spend their time on agriculture and fishing.

The labour organisation currently practiced by households in Tonga varies depending on the type of production and economic activity pursued by that household. Labour can be done by individuals, by family labour, by work in communal groups as well as by hired casual labourers either in individuals or in communal groups (Hardtaker et al. 1988).

Current Agricultural Development Objectives and Strategy.

One of the main objectives of the government in the Sixth Development Plan is to boost economic growth and employment
and also to promote an equitable distribution of income among Tongans (Central Planning Dept. 1991).

Regarding agricultural development, the strategies adopted by the government (Central Planning Dept. 1991) are aimed at strengthening exports by further increasing the productivity of the current agricultural exports such as rootcrops, vanilla and pumpkin. In addition, the policy is to explore the possibilities for development of new markets and diversification into production of more agricultural export commodities.

**Key Constraints to Tongan Agriculture**

The land tenure system is the main constraint in agricultural development. This is because there are many acres of fallow land which have not been cultivated for many years (especially the nobles' estates and tax allotments of people who have migrated overseas). This land is not accessible for farmers who are interested in agriculture but have no land. Nothing much can be done about this without constitutional change.

There have been some further constraints which should be discussed including the following:
(a) Labour Cost

The rural labour costs limit the production choices available to farmers because the hourly rate is very high (about T$2.50 to T$3 per hour). These rates affect the profitability of the crops selected by the farmers. Thus agricultural development now tends to focus on a general high productivity of labour through improved farming method, tools or mechanisation (Hardtaker et al. 1988; World Bank, 1990; Sturton, 1992).

(b) Irrigation

As Tongan agriculture is entirely dependent on rainfall some introduced cash crops such as pumpkin may be affected due to low rainfall or no rainfall during the planting season. According to the World Bank (1990), irrigation is necessary to supply water, however, the water for irrigation is not readily available as Tongan islands are small and the underground water is shallow and salty. The World Bank (1990) further recommended that there is a need for a water resources utilisation and management strategy to address the water availability problem. This is particularly crucial during the pumpkin season as the pumpkins require plenty of water during the growth period.
(c) **Quality Standard**

Quality standard requirements in overseas markets have been the major set back in Tongan agricultural exports (Fleming 1988, World Bank 1990, Sturton 1992). According to the World Bank (1990), this is due to poor post-harvest handling and management habits on the farm and packing house operation. This leads to a poor quality of export produce which has often been the cause of low export prices, and high degrees of damages and rejection have occurred. In most cases Tongan authorities have been unable to meet the quarantine and quality requirements enforced in overseas markets.

(d) **Market and Marketing**

Lack of exporting markets for Tongan agricultural commodities is one of the main constraints. This is because Tonga is far from the potential overseas markets. Not only this, but Tonga has not fully explored the market opportunities in the overseas markets due to the lack of expertise to perform market research.

A lack of marketing management skills in export marketing in the government and exporting organisations has been
recognised as a fundamental problem (World Bank, 1990; Sturton, 1992). This is mainly due to the lack of marketing training, research and marketing information available to the marketers and government officers involved with the marketing process.

Conclusion

This chapter has given an overview of Tongan agriculture. Tongan agriculture is based on small holder farmers aiming for production as well as commercial crops. Although the cropping system is based on mixed cropping with low production inputs, monocropping was practised on a small scale until the inception of pumpkin industry development which has a substantial impact on traditional cropping system.

The next chapter will discuss the operation of the pumpkin industry. It will also discuss the operators and their roles played in the development of the industry.
CHAPTER 3

AN OVERVIEW OF THE PUMPKIN INDUSTRY

Introduction

This chapter provides an introductory overview of the operation of the pumpkin industry.

Background

The industry was started in 1987 by a private farmers' group known as the Tonga Growers Association, led by the Honourable Mailefihi Tuku'aho under the supervision of a pumpkin exporting company from New Zealand known as the New Zealand Trade Company Limited (Holo, pers. comm.).

In initiating the industry, the New Zealand company aimed to supply a seasonal market niche (November-January) in Japanese pumpkin imports. This seasonal market niche is the gap between the pumpkin seasons of the two main suppliers (New Zealand and Mexico) and the domestic production.

The industry aims to produce good quality pumpkins to export to Japan. Table 14 presents the growth trends of the industry in terms of the number of farmers involved as well as the export tonnage. The Table shows that the exports in the 1992 pumpkin season was reduced by almost half of the 1991 exports as an attempt by the government to control the oversupply of the market niche. It should be noted that the
unit used is the metric ton (tonnes) per acre because the references collected from the Tongan government Ministries and Institutions such as the Bank are expressed in this unit.

<table>
<thead>
<tr>
<th>Year</th>
<th>Growers</th>
<th>Exporters</th>
<th>Export Qty (tonnes)</th>
<th>% increase</th>
<th>Average yield/ac (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>40</td>
<td>1</td>
<td>153</td>
<td></td>
<td>0.77</td>
</tr>
<tr>
<td>1988</td>
<td>67</td>
<td>1</td>
<td>917</td>
<td>499</td>
<td>2.24</td>
</tr>
<tr>
<td>1989</td>
<td>164</td>
<td>1</td>
<td>3013</td>
<td>299</td>
<td>3.74</td>
</tr>
<tr>
<td>1990</td>
<td>392</td>
<td>2</td>
<td>5729</td>
<td>90</td>
<td>3.54</td>
</tr>
<tr>
<td>1991</td>
<td>&gt;1500</td>
<td>8</td>
<td>21858</td>
<td>282</td>
<td>4.00</td>
</tr>
<tr>
<td>1992</td>
<td>&gt;1000</td>
<td>7</td>
<td>10460</td>
<td>-114</td>
<td>NA</td>
</tr>
</tbody>
</table>


**Operation of the Industry**

According to Holo (1992), the industry started without local research findings and experience about field management practices and the technology of pumpkin production. However, Group Trade Ltd was very confident that the New Zealand experience was sufficient to meet the field management requirements of the Tongan farmers (Holo, 1992). Unfortunately, the first attempt in 1987 failed to make any profit due to a drought and the inexperience of Tongan farmers.
Following a subsidy given by the government to the industry in the 1988 and 1989 seasons (TDB, 1991b), the industry was shown to be a viable enterprise if the operation costs could be reduced and the management of the industry could be properly coordinated. Thus, with research findings recommended by the research division, the production improved and the marketable yield in the 1990 season was very satisfactory. In addition, the prices to the farmers were reasonably high in comparison to previous pumpkin seasons (Sevele, 1990).

During the preparation for the 1991 pumpkin season, it was anticipated that there would be a "pumpkin rush" due to the profitability of the returns to the farmers and exporting companies in 1990 (TDB, 1991b). The government was advised by the Tonga Development Bank to limit the number of pumpkin exporters and control the total market share at about 10,000 tonnes for 1991 (Sevele, 1991; TDB, 1991b). This was to enable the exporters to produce good quality pumpkins and bargain for higher prices. However, this advice was ignored resulting in the pumpkin crisis in the 1991 season.

The Squash Investigating Team which investigated the crisis in 1991, identified a number of problems:

a) an overwhelming volume of supply;

b) a high percentage of low quality fruits due to decay and disease;

c) inclusion of undersized fruits packed in the middle of many bins;

d) the depressing of the market price (Tonga Government, 1992, p.2).
According to the Squash Investigating Team Report, about 15 percent (or 3,278 tonnes) of the total export volume of 21,858 tonnes exported to Japan in 1991 was rejected by the importers due to the oversupply of the market niche with low quality and undergrade pumpkins. This resulted in a loss of at least T$2.7 million to the importers and a substantial decrease in the overall price from 275 Yen per kilogram in December 1990 to 167 Yen per kilogram of pumpkin in December 1991 (Tonga Government, 1992).

Although the total foreign earnings from pumpkins reached a record of T$15 million in 1991 (Tonga Government, 1992), the pumpkin crisis that year certainly hinders the longer term development of the market niche in Japan, especially with its complex and sophisticated import market.

Table 15 presents the contribution of the industry to the agricultural exports.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumpkin</td>
<td>28.00</td>
<td>52.2</td>
<td>76.00</td>
<td>66.5</td>
</tr>
<tr>
<td>Others</td>
<td>72.00</td>
<td>47.8</td>
<td>24.00</td>
<td>33.5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Who are Involved and their Roles

Since the establishment of the industry the exporters and farmers have been the main parties directly involved with the execution of production and marketing. However, the development of the industry involves not only producers and marketers, but also government departments and the Tonga Development Bank. The four main parties involved and their roles played are as follows:

(a) The Government Ministries

There are two Ministries under the Government directly responsible for the development of the industry. These are the Ministry of Labour, Commerce and Industries and the Ministry of Agriculture and Forestry. These two Ministries formulate the policy guidelines and regulations regarding the development of the industry and endorsed by the government for implementation including:

(i) Ministry of Labour, Commerce and Industries (MLCI).

The roles of MLCI are: a) to formulate policy and regulations regarding business and trade; b) to issue export licences to exporters; c) to allocate the market share to individual exporters; d) to liaise between the government and the exporters and also among exporters (Fa'otusia, pers. comm. 1992).

The issuance of export licences is based on criteria regarding the performance of the company. However, the
criteria formulated have yet to be fully applied for the selection of the exporters (Fa'otusia, pers. comm. 1992). The criteria are: (Tongan Government, 1992, pp.49-50):

* Experience and competence in business and management.
* Sound management system of Organisation.
* Registered company with sound financial situation and business reputation.
* Adequate infrastructure for marketing activities such as packing and storage houses and facilities.
* Involved in assisting growers from production development to marketing.
* Proof of marketing contract and arrangement with reliable importer(s).
* Meeting (not exceeding) market quotas.
* Meeting quality standard.
* Meeting shipping schedules.
* Having a binding contract with shippers.

These criteria are guidelines for consideration under the discretion of the Minister of MLCI. The exporter has to submit an application for an export licence together with the importer's contract and proposed market share. The number of farmers who would be involved in production must be indicated. The export licence is issued to exporters on an annual basis for each pumpkin season (Fa'otusia, pers. comm. 1992).

Once an exporter's application is accepted, the Minister of Labour, Commerce and Industries then allocates the actual market quota to that exporter. The allocation of market quota is based on the market share offered by the importer and the past performance of the exporting company.

The role of issuing an export licence is crucially important as the demand for licences is always high while the niche market share is limited.
(ii) Ministry of Agriculture and Forestry (MAF)

The MAF plays an important role in developing the industry, especially in researching and advising farmers on technology for production and marketing development, such as quality control management. There are four divisions under the MAF directly responsible for the support services given to the development of the industry (Sisifa, pers. comm. 1992).

(1) Research Division

The Research Division is responsible for all research programs considered relevant to the development of the industry. This is particularly important to production development, such as fertiliser application rates, and pest and disease control.

Since the starting of the industry, the contribution of the research findings has proved to be very successful in terms of increasing marketable yield and the reduction of disease incidence in production development (Holo, pers. comm. 1992). However, more research programs are required, particularly in soil fertility, virus disease control and post-harvesting.

(2) Extension Division

The Extension Division is responsible for conveying recommendations from research to the pumpkin growers.
This task is executed through individual visits to growers as well as farmers' group training. The training emphasises the application of technology, such as fertiliser application and disease control. The extension officers focus on exporters and their farmers' groups.

(3) Quarantine and Quality Management Division (QQMD)

The Quarantine and Quality Management Division is responsible for the inspection and checking of the quality standard to make sure that requirements for export pumpkins are maintained. The division is also responsible for the training of exporters about the regulations concerning quarantine and quality requirements. In addition, the division has the responsibility of issuing the phytosanitary certificates to exporters who satisfactorily comply with the agricultural export regulations (Englberger, pers. comm. 1992).

The division plays a crucially important role regarding quality standard requirements. The final inspection of quality is dependent on how the divisional officers execute their duties. According to Englberger (1993), this job will be much easier if the farmers and exporters understand and cooperate with the quality standard requirements already known.
(4) Machinery and Mechanical Services Division

The division's role is focused on the land preparation aspect of the production process. Land preparation has to be done by a tractor and implements such as disc ploughs and disc harrows, but most of the farmers do not have this machinery, (apart from few rich farmers who can afford to buy tractors and implements). The government offers this service on a hire basis.

The division is responsible for administering a schedule of programs for land preparation. Land preparation has to coincide with the planning of planting time as well as shipping time. It should be started no later than 10 to 12 weeks before sowing (Speijer et al. 1989). According to Speijer, this is very important so that the pumpkins reach a suitable maturity stage and also because the storage period of pumpkins is too short. This requires farmers, exporters and the Bank to cooperate with the division in order to execute the land preparation programs in time before planting the pumpkins (Tu'ipulotu, pers. comm.).

(b) The Exporting Companies

The exporting company (exporter) is responsible for the planning, implementing and control of activities involved with production development as well as marketing. Table 16
presents the exporting companies which have exported pumpkins since the industry started.

Based on discussions with exporters their roles are:

* negotiating with the Japanese importer(s) for a proposed market share and prices;
* formation of a group of farmers through a registration of farmers under that company;
* applying for an export licence;
* arranging loans on behalf of farmers with the Tonga Development Bank;
* ordering and preparing the production inputs such as fertiliser, seeds and chemicals;
* ordering and preparing the bins for the packing of pumpkins;
* arranging the shipping of pumpkin exports;
* coordinating farmers' training with the MAF;
* planning the planting schedule for the farmers;
* preparing the marketing facilities such as storage and packing houses as well as package equipment;
* organising regular meetings with the farmers;
* monitoring and evaluating the progress of the farmers' production development.

The industry started its export marketing with a Growers Association and later registered as an exporting company. Since then more companies have been attracted by the perceived profitability of pumpkin exports. There are now seven exporting companies currently involved in pumpkin
Table 16: EXPORTING COMPANIES AND PUMPKINS EXPORTED: 1987-1992

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exporting companies</td>
<td>Quantity (tonnes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonga Growers Association</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Manufacturing Blending &amp; Marketing Ltd. (MBM Co.Ltd.)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,963</td>
<td>8,976</td>
<td>2,029</td>
</tr>
<tr>
<td>* Squash Exporters Company Ltd. (SECL)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,635</td>
<td>4,054</td>
<td>2,303</td>
</tr>
<tr>
<td>Ha'amо Growers Company Ltd.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>196</td>
<td>700</td>
</tr>
<tr>
<td>Primary Produce Export Ltd.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,173</td>
<td>2,532</td>
</tr>
<tr>
<td>Touliki Trading Export Ltd.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,374</td>
</tr>
<tr>
<td>Tai Agency</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4,600</td>
<td>600</td>
</tr>
<tr>
<td>Island Produce Corporation (IPC)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>892</td>
</tr>
</tbody>
</table>

Source: Compiled: Englberger, 1993; TDB, 1991a; Sefanaia, 1992; TDB, 1991b

* The two companies originally formed the Tonga Growers Association

In fact only a few exporting companies have been organised as established business organisations. The phrase 'established business organisation' refers to an exporting company which
has a full time manager to manage the daily operation of the company as well as having some investment on infrastructure and marketing facilities. In fact most of the exporting companies are operated on an ad hoc basis and only during the pumpkin season as well as having no full time staff and being poorly organised (Tonga Government, 1992).

Despite the poor organisation of some of the exporting companies, they manage with their limited resources to implement the minimum requirements of quarantine and quality regulations.

(c) The Pumpkin Growers

The growers' role is the most important and difficult task as far as production is concerned. The quality standard of pumpkins has to begin with the initial stage of production. And this task is entirely dependent on the farmer's field practices, starting from land preparation, planting, field management (such as fertiliser application, disease control and weeding), as well as the harvesting and transporting of pumpkins to the packing house.

(i) Selection of pumpkin growers

The selection of growers to grow pumpkins is done by the exporter. Because of the perceived profitability of growing pumpkins, almost every household in the pumpkin growing regions wants to grow pumpkins. The growers include a wide variety of member of society such as, full time and part time
farmers, non-farmers, employees of the private and public sectors, and even the Ministers and Chief Executives of the business community. Table 17 presents the trend of pumpkin growers and acres planted. It should be noted that the 1991 and 1992 figures are estimates.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Growers</td>
<td>40</td>
<td>67</td>
<td>164</td>
<td>392</td>
<td>&gt;1,500</td>
<td>&gt;1,000</td>
</tr>
<tr>
<td>Acres Planted</td>
<td>200</td>
<td>402</td>
<td>804</td>
<td>1,617</td>
<td>&gt;4,000</td>
<td>&gt;3,000</td>
</tr>
</tbody>
</table>

Source: Compiled: TDB, 1991b, 1992; and Data Collected from Exporters.

Even though Tonga is an agriculturally orientated country, farming is the last employment option for a male member of the household looking for a job. This is because the Tongan society treated agriculture as a difficult and dirty job which has a low status. Recently the attitude has started to change both in rural and urban communities. The economic potential of agriculture is increasingly recognised. As a result every household with access to land wants to grow pumpkins for income. Table 18 displays the distribution of acreage by size to farmers. For 1991, totals (of growers as well as the total acreage grown) refer only to farmers financed by the Bank.

The Table shows that the majority of pumpkin growers were allocated with 2-4 acres per grower and these growers were
the main pumpkin producers for the market share.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2</td>
<td>187</td>
<td>552</td>
<td>371</td>
<td>1044</td>
</tr>
<tr>
<td>3-4</td>
<td>119</td>
<td>212</td>
<td>434</td>
<td>798</td>
</tr>
<tr>
<td>5-8</td>
<td>55</td>
<td>116</td>
<td>343</td>
<td>746</td>
</tr>
<tr>
<td>9-12</td>
<td>17</td>
<td>27</td>
<td>179</td>
<td>294</td>
</tr>
<tr>
<td>13-15</td>
<td>2</td>
<td>5</td>
<td>29</td>
<td>40</td>
</tr>
<tr>
<td>&gt; 16</td>
<td>12</td>
<td>19</td>
<td>261</td>
<td>304</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>392</strong></td>
<td><strong>901</strong></td>
<td><strong>1617</strong></td>
<td><strong>3256</strong></td>
</tr>
</tbody>
</table>


Despite the high demand from the people to grow pumpkins, the exporting companies have their own criteria of selecting pumpkin growers. Those exporting companies who operated in the previous pumpkin seasons have already established their farmers' groups. According to the conversation with exporters, new growers are only recruited if the market share of an exporter will increase. The exporting companies usually select their growers based on the quality standard the farmers produced and their experience in commercial farming.

The following are the types of people involved in pumpkin growing based on observations made during the field work:
* experienced commercial farmers either full time or part time;
* non-farmers especially employees in private and public sector;
* ordinary farmers involved in food production as well as cash crop production, usually known as semi-commercial farmers. The majority of pumpkin growers are in this group.

There are some inexperienced growers in the industry, the majority of these people are non-farmers. They tend to adopt technology readily and easily follow advice given by the extension officers. On the other hand, subsistence farmers who concentrate on rootcrops farming are reluctant to adopt the technology recommended, as well as taking more time to recognise the importance of producing good quality pumpkins.

(d) Tonga Development Bank (TDB)

The role played by the TDB in the development of the industry is crucially important. Any agricultural enterprise needs working capital to become effectively established. This is needed to buy input supplies and to hire labour. Without loan funds released by the TDB, the production and marketing development of the industry would not be very successful, because only a few rich people could afford to grow pumpkins which are a cash crop requiring high input costs. The majority of the smallholder farmers cannot afford to grow pumpkins without financial assistance from the TDB. The TDB has financed the development of the industry both in production and marketing since its inception in 1987. The
Bank gives credit to growers to pay for their expenses in production costs. This includes land preparation, seeds, fertilisers, chemicals and labour. The Tonga Development Bank (TDB, 1991b) reports that 70 percent of the total production cost is financed by the bank. Table 19 presents the value and number of loans approved by the TDB.

<table>
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<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Loans</td>
<td>40</td>
<td>67</td>
<td>160</td>
<td>378</td>
<td>1021</td>
<td>875</td>
</tr>
<tr>
<td>(Growers)</td>
<td>26.0</td>
<td>43.55</td>
<td>540</td>
<td>1,066</td>
<td>4,742</td>
<td>NA</td>
</tr>
</tbody>
</table>


The TDB also finances marketing costs such as infrastructure, including packing and storage houses, packaging materials and freight charges.

The repayment of the loans has to be settled at the end of the pumpkin season when all the proceeds are received from the importers.

(e) Input Suppliers

In any agricultural enterprise agricultural input supplies, such as seeds, fertilisers, chemicals, farming equipment and tools have to be readily accessible. In the pumpkin industry
the organisation of input supplies is dependent on private firms. The exporting companies have to make an arrangement with the firms to order the required input supplies for each pumpkin season. The problem with this type of arrangement is that the costs of input supplies are relatively high.

The other alternative used, is for the exporting companies to import the input supplies directly in bulk and then sell them to their respective farmers' groups at lower prices. This option has been implemented by some exporting companies and it seems that the prices for the input supplies are cheaper than through the private firms.

**Production Development**

The growing cycle of pumpkins is relatively short. It takes only 90 days (Englberger, 1986; Speijer and Smit, 1989). As a short term crop for export marketing, technology plays an important role in production development. The production process has to be well organised, particularly in the preparation of production inputs such as seeds, fertilisers and chemicals as well as land preparation.

(a) **Technical Research Findings for Production Development**

The technical research is the key factor in improving the quality standard and the productivity as far as the production development is concerned. The success in the technical research is a catalyst for the development of the niche market. This section discusses the technical findings from various trials conducted by the Research Division
of the MAF for the improvement of the production process.

The field trials conducted were focused on fertiliser response and application rates, disease control, variety evaluation and plant density trials (Holo, pers. comm. 1992). The results of these trials were recommended to farmers to adopt to improve their management practices in order to increase yield and produce quality standard pumpkins.

Although the industry was started without local research, some research conducted on fertilisers and disease control helped in training farmers in the 1988 season to successfully produce 971 tonnes of export pumpkins (Holo, 1992).

After the successful production in 1988, more trials were carried out to further investigate a more precise fertiliser application rate. Speijer et al. (1989) recommended 4 bags (50 kg) of NPK complex fertilisers per acre for pumpkin growing in Tonga. According to Speijer et al, there was a response of pumpkins to increase rate of N (nitrogen fertiliser).

Halavatau et al. (1990a) conducted trials on the 'fertiliser requirements of pumpkins' and the results concluded that the influence of N and P on fruit yields of pumpkin were significant and recommended a profitable rate be 56-24-0 (kg of N.P.K.) per acre.

Manu et al (1989) after analysing their field experiment on the 'Evaluation of different methods of fertiliser application on growth of pumpkin' concluded: (Manu et al.
* fertiliser increases the rate of growth of pumpkin as more fruits mature earlier relative to the control;
* increasing the rate of fertiliser applied does not necessarily increased the yield. But applying the appropriate balance fertiliser increases the yield significantly;
* splitting the dosage of fertiliser to band and mix before planting and then side dressed then follow by another side dressed gives the best, highest yield.

Further investigation conducted by Manu (1990a) on the 'Response of Fahefa soil' concluded that the placement method of application of the basal fertiliser and the duration between applying and planting is to be re-investigated to prevent seedlings from being burned by fertilisers, resulting in low germination. The inclusion of sulfur seems to be more beneficial than increasing the NPK rates.

Manu (1990b) also found in his trial on the 'Effect of the placement method of basal fertiliser on yield response of pumpkin' that the optimum placement of the basal fertiliser was within a 30cm width and to a depth of 15 cm deep applied 15 days before planting in order to avoid the fertiliser burning seedlings when germinated. Manu further reported that excessive nitrogen promoted longer vegetative growth, resulting in premature fruitfall of the early fruitset. It was recommended that 45 kg N per acre is the optimum amount of nitrogen for a pumpkin crop. According to Manu there was no significant increase of pumpkin yield due to the addition of sulfur fertiliser.

Savelio (1991b) found in a 'Pumpkin density trial' that when
the plant population increases there are more fruits produced but less marketable yield (\( > 1.2 \text{kg fruit} \)). This was due to increasing competition for soil nutrients and water with the increase in plant density.

According to Savelio (1991a) in his 'Pumpkin variety trial', the Kurijiman variety produced the highest marketable yield as well as having good characteristics of fruit weight, percentage of sugar content and taste.

Halavatau et al (1990b) investigated the 'Effect of vine clipping on pumpkin yields'. This field management practice is commonly used by Japanese farmers to increase marketable yield per unit area up to about 10 tonnes per acre. However, Halavatau found that vine clipping had no effect on yield and fruit sizes of pumpkins. Further investigation is required to clarify this finding as the trial was carried out in unfavourable climatic conditions, particularly due to lack of precipitation.

Regarding the shrinkage in pumpkin fruit during post harvest, Halavatau et al (1990d) found that the fruit shrinkage in 3 weeks after harvesting was 6 percent. Thus, 7 percent of fruit shrinkage should be the standard weight loss prior to the off loading of pumpkins in Japan.

Halavatau et al (1990c) investigated the 'Development of sugar content in pumpkin fruit'. They concluded that 45 days from the producing of the fruit or 85 to 90 days from planting, the fruit has 8 per cent sugar and that this is
about time to harvest fruit. According to Halavatau, the sugar content would increase to 12 per cent 3 weeks after harvest, when the pumpkins would be expected to arrive in Japan. The Japanese consumers prefer 10-12 percent sugar content in pumpkins.

Speijer and Smit (1989) found that the major constraints are the low production per acre and post harvest handling. According to Speijer and Smit, powdery mildew was the most common problem, reducing farmers' revenue by about 29 percent of revenue when the diseases was not properly controlled. They also found poor land preparation caused a considerable yield reduction.

(b) Land Preparation

The grower is responsible for the land preparation. The pumpkin plot has to be ploughed at least two times, followed by discing and lining. All these activities are done by a tractor drawn implement. Land preparation has to be done thoroughly in order for pumpkin crops to grow vigorously. This should be done 10-12 weeks prior to planting (Speijer et al. 1989).

(c) Planting

The soil has to be fertilised and then sown with pumpkin seeds. The seeds are planted in rows at two to three seeds per mound (MAF, 1992b). The recommended spacing is two meters apart and the seeds should be germinated for between 5 to 12 days (Speijer et al. 1989). These seeds are hybrid seeds
PLATE 5

Poor land preparation

PLATE 6

Good land preparation
produced and exported by some Japanese Seed Producers to pumpkin growing countries, including Tonga (Savelio, 1991a). The pumpkin crops need a lot of water during their growth stage. The growers rely primarily on rainfall. However, if there is no rain for at least 3 weeks, the growers should manually water pumpkin plots by delivering well water (MAF, 1992b). Without rainfall in the pumpkin season, the growers and exporters cannot expect a good harvest. This means that the contracted market share will not be met in that season, as happened in the 1987 pumpkin season (Speijer et al. 1989).

(d) Pumpkin Varieties

The Japanese consumers have specific preferences for pumpkin varieties as each variety has different characteristics, such as colour, shape, sugar content and taste. Therefore the exporters have to produce the varieties preferred by the consumers. The problem is that there are some preferred varieties which cannot be grown economically in Tongan conditions due to climatic differences.

Two varieties, the Delica and Nishiki Ebisu, were introduced by the industry without being tested in local conditions. Fortunately, these two varieties produced reasonable yields and had good characteristics preferred by the consumers (Speijer et al. 1989).

In 1990, additional varieties were introduced and tested to observe their performance and characteristics in Tongan
conditions. The result of the trial concluded (Savelio, 1991a) that four varieties are capable of producing high yield and good characteristics including Delica, Kurijiman, Nishiki Ebisu and Super Squash Number 5. The best variety is Kurijiman.

(e) Pest and Disease Control

There are several pests and diseases of economic significance and they require extensive spraying programs (Speijer et al. 1989). Since the inception of the industry, according to Speijer, the most important disease problem is the fungal disease known as powdery mildew which reduces leaf area, stunts vine growth and lowers yield. Because of reduced leaf cover, the fruits are also susceptible to sunburn, which causes major additional loses (Speijer et al. 1989).

Powdery mildew control requires regular spraying with systematic fungicide at 7 to 10 day intervals during the growing period (Speijer et al. 1989). Despite the costs involved in the control program, the growers manage to control the disease and still produce a profitable crop.

In the 1991 pumpkin season another serious problem known as virus disease emerged (Manu, 1991a). Investigation done by the Research Division confirmed that this virus disease could be a potential threat to the industry if the growers would not take necessary control measures (Holo, 1991). Further investigation reported that virus diseases can reduce marketable yield by 10 to 20 percent (Manu, 1991a)
PLATE 7

Pumpkin on seedling stage (3 weeks)

PLATE 8

Pest and disease control with mist blower
An effective control measure has not been found to address this problem. However, MAF (1992b) recommends a total pest management type of control. This is the combination of cultural and chemical controls, aiming to prevent the aphids carrying the virus. However, when the disease pressure was high none of these methods were effective on reducing virus incidence (Holo, 1993).

Because this is a most threatening problem for the development of industry, there is a virus research program currently being undertaken by the Research Division. This research involves the testing of a mild virus which is inoculated to raise pumpkin seedlings free of virus disease strains (Holo, 1993). According to Holo, the mild virus will be resistant to an infestation done by the diseased virus strains therefore the pumpkin crops will be grown free of diseased virus strains.

According to Holo (1993), the mild virus has not appeared to be effective in the first stage of the mild virus research program. However, the research program has yet to be completed. If it is successful, an extra cost of production will be encountered by the farmers.

(f) Soil Fertility

Pumpkin is a fast growing and heavy feeder crop which grows in a short period of time (MAF, 1992b). The fertility level of the soils of Tonga are not capable of supplying nutrient requirements for pumpkin growth, unless the growing
PLATE 9

Flowering stage of the pumpkins (4-6 weeks)

PLATE 10

Fruiting stage of the pumpkins
is supplemented with fertilisers such as NPK compound fertiliser and urea.

The crucial aspect in the application of fertiliser in growing pumpkins is the question of what is the optimum application rate required to supplement the nutrient deficiencies of the soil. According to discussions with farmers, there have not been precise recommendations on how much fertiliser to apply in order to produce the highest marketable yield for export and at the same time to minimise the cost of fertilisers.

Although there has been a general recommendation for fertiliser application rate for farmers from the previous trials, the precise rate of application for individual fields has yet to be investigated. There is a need to address this issue in order to produce high yield per unit area as well as reducing the cost of fertiliser to farmers.

(g) Yield and Harvest

After 85 to 90 days from planting, the fruits are mature for picking (Speijer et al. 1989). According to Savelio (1991a), at this maturity stage the pumpkins have around 8 to 10 percent sugar content. The sugar content requirement of Japanese consumers is around 10 to 12 percent (Holo, pers. comm. 1992). And this is why the fruits have to be picked in this period. An earlier or later harvest than this period (85-90 days) will cause a problem of either too low sugar or too high sugar content in the fruit (Savelio, 1991a). This
PLATE 11

Harvesting process

PLATE 12

Harvesting process
would incur loss to growers when their fruit is rejected by the inspectors.

During the harvesting period the exporter and growers work together to assure the fruits are mature prior to picking. The picking is usually done by hired labourers with the help of family labour. The grower is responsible for transporting of fruit to the packing house.

The growers produce an average marketable yield range from 2.5 to 4 tonnes per acre (TDB, 1991b). Few growers have produced more than 8 tonnes per acre of marketable yield which is very high in Tongan conditions (TDB, 1991b). In Japan pumpkin growers produce an average marketable yield of 10 tonnes per acre (Manu, 1991a).

It has been confirmed from the statistics compiled by the TDB (TDB, 1991b, 1991c), that the growers planting fewer acres (2-4) produced higher yields per acre than those growers who planted larger areas (5-16 acres) (Table 20).

This is apparently because the growers with smaller pumpkin plots have managed their plots properly with regard the applying of the recommended technology. In comparison, the growers with bigger areas do not manage their plots properly, resulting in low yield, although there have been a few growers who have produced higher yields as shown in the category of 9-12 acres in Table 20.
<table>
<thead>
<tr>
<th>Acres</th>
<th>1990</th>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2</td>
<td>3.4</td>
<td>5.1</td>
</tr>
<tr>
<td>3-4</td>
<td>3.0</td>
<td>4.9</td>
</tr>
<tr>
<td>5-8</td>
<td>2.8</td>
<td>4.6</td>
</tr>
<tr>
<td>9-12</td>
<td>2.7</td>
<td>6.4</td>
</tr>
<tr>
<td>13-15</td>
<td>2.2</td>
<td>3.0</td>
</tr>
<tr>
<td>&gt; 16</td>
<td>2.9</td>
<td>4.7</td>
</tr>
<tr>
<td>Total (Average)</td>
<td>2.8</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Source: TDB, 1991b, 1991d,

Marketing

(a) Marketing System

The marketing system used since the operation of the industry has been a decentralised system which involves the grading and packing of pumpkins being done by the growers in their homes or in village halls. This is the traditional marketing system used by the Tonga Commodities Board in the 1980s for the exporting of bananas and watermelons to the New Zealand market.

The system almost entirely relies on farmers grading and packing with very minimum supervision from the exporter. The growers are responsible for grading, packing and transporting their packed bins to the exporter's storage house. The
Decentralised packing and grading system where the farmer does the grading and packing

Transportation of farmer's pumpkins after packing to the exporting company's storage shed for final inspection
exporter inspects the growers' bins at the storage house according to quarantine and quality requirements. The final inspection is carried out by the QQMD prior to shipping. Finally the QQMD issues a phytosanitary certificate to the exporter to send to the importer.

It has been recognised that the exporters in this marketing system have not been much involved in grading and packing, which are supposed to be their task, rather than that of the growers. However, most farmers prefer this system as they are free to grade and pack whatever they like. As a result the quality standards are not met.

(b) Post Harvest Handling and Treatment

After the harvesting, the farmer has to transport the pumpkins to his packing house. The fruits have to be cured as well as cleaned and packed. Curing refers to the cutting or trimming the stalk on the fruit, leaving not longer than 10 millimetres as well as removing the skin on the stalk. The fruits have to be dried before packing (Englberger, 1992).

(c) Grading

Grading has to be done inside the packing house. The standard weights for grading range from 1.2-2.7 kilograms of loose pumpkin. The marketable fruit must be free of pests and disease symptoms as well as soil. It should also be free of mechanical injuries or defects such as vine marks, callousing, soil bleaching or ground spot, sunburn and should not be misshapenned.
Postharvest treatment; Trimming of stalk and removing of the stalk's skin in a central packhouse

Postharvest treatment in the village's packhouse
PLATE 17

Cleaning of pumpkins by conveyor belt machine before grading and packing in the central packhouse

PLATE 18

Grading and packing of pumpkins in the central packhouse
(d) Packaging

Imported woods are used by the exporters to make bins for the packing of pumpkins. Each bin has to carry a net weight not less than 500 kilograms of pumpkin. Good packing may be the deciding factor between the produce being sold for a profit or dumped at a loss (Atkinson, 1991).

(e) Inspection System

In the decentralised packing system, the packed bins are not 100 percent inspected by the importers or even the quarantine and quality inspectors. In the centralised packing system, the pumpkins are 100 percent inspected by the exporters during the grading and packing prior to randomised final inspection by the quarantine and quality inspectors (Englberger, 1993).

(f) Storage and Transportation

The exporting company is responsible for storage of the packed pumpkin bins in a well ventilated storage shed, waiting for the ship to arrive. The marketing process after the harvesting date is restricted to a maximum of two weeks prior to shipping. Shipping the pumpkins is under a contract charter either by a single exporter or some exporters in a share-cargo basis. Individual charter has more risk than share-cargo as the exporter has to be charged with dead-freight if the contracted cargo space cannot be filled (Government of Tonga, 1992).
PLATE 19

The inspection done by the exporting company. The inspectors check the weight of the pumpkins.

PLATE 20

Final inspection done by quarantine & quality management inspectors.
(g) New Marketing System

In 1992 pumpkin season some exporters have moved from the decentralised marketing system to a centralised marketing system in which the grading and packing are done by the exporters. In this system, the exporters use conveyor-belt machines and hired labourers to do the grading and packing. At the same time a 100 percent inspection is carried out. The QQMD (Englberger, 1993) reports that the system is much more effective and convenient in terms of grading and executing the task of inspection. The quality standard has been substantially improved.

Conclusion

Understanding the operation of the pumpkin industry as well as roles played by each group regarding the production and marketing processes, the next chapter will look to Japan and its market. The chapter will focus on the environment of the Japanese vegetable markets, particularly the Japanese pumpkin market. It will also look at Japan's pumpkin imports and their suppliers as well as the market niche for Tongan pumpkins.
CHAPTER 4

THE JAPANESE PUMPKIN MARKET AND ITS ENVIRONMENT

Introduction

Japan is now the second largest market in the world for consumer and industrial goods after the United States (Morgan and Morgan, 1991). Japan has become an increasingly important market for imports over the years. Japan's imports of vegetables including pumpkins have nearly doubled from 1985 to 1990 (Tradescope, 1992).

Because the Japanese pumpkin market and its environment is complex and has not been understood by most of the Tongans involved in the pumpkin industry, particularly the exporters and the farmers, it is relevant to analyse the market environment.

Understanding the market environment and the market place, the people involved in the industry have to adapt themselves to fit with the market place and its requirements. The main discussion in this chapter is an analysis of Japanese pumpkin imports with emphasis on the market niche for Tongan pumpkins. A discussion in the theory of the marketing concept and marketing principles will follow in chapter 5 to identify the issues concerning with marketing of the pumpkin industry.

It should be noted that due to the limited source of information available on Japanese vegetable consumption,
the author has often been forced to use figures from the 1980s as a guideline for the trends of the vegetable markets in Japan. Because the Japan references use imperial measures of weight rather than metric the weights in this chapter are expressed in tons rather than tonnes. Area is expressed in hectares rather than acre which is used by the references produced in Tonga.

Market Environments

(a) Physical Environment

Japan is an island country of the east coast of Asia. Its geographical location is between 172 and 154 degree east longitude. Agricultural land occupies only 14 percent of the total land area (Japan Statistics Bureau, 1992). Of the arable land, plains and basins with a good water supply are utilised mainly as paddies for rice production, while other areas are utilised as dry fields for the production of crops such as pumpkin (Japan Statistics Bureau, 1992).

Japan is in the temperate zone between the tropics and the arctic. It has a mild climate and four season (JETRO, 1992a). Because the shape of Japan is long and narrow from north to south, and subject to influences from the climates of Asia and the Pacific ocean, the climate varies considerably according to region. This enables Japan to plant a range of temperate and tropical crops including pumpkin (Japan Statistics Bureau, 1992).
(b) **Political Environment**

The postwar Japanese constitution has created a government that combines American-style legislative procedures with a British-style parliamentary framework (Japan Statistics Bureau, 1992). According to the report of the Statistics Bureau, the lower House elects a Prime Minister and the Prime Minister then picks his own cabinet.

The political stability in Japan contributes to the development of the market for the Pumpkin industry in Tonga as the exchange rates are relatively stable and because there are no tariffs imposed. The political environment for the industry seems favourable.

(c) **Economic Environment**

The Japan External Trade Organisation (JETRO), reports that during the second half of the 20th century a remarkable level of economic advancement has given Japan one of the richest consumer populations in the world (JETRO, 1988a). According to the JETRO (1991a), Japan's economy continues to show healthier performance. The JETRO (1992a) indicates that the Japanese economy would continue to show moderate growth during the next five years. This favourable economic environment would boost market opportunities for Japanese imports including pumpkins.

The economic performance is sound with an annual growth rate in real GNP of 4.5 percent (JETRO, 1992a, 1992b). According
to JETRO (1992a), the per capita GDP of Japan amounted to US $25,430 and the trade balance of payment had a US $500 million surplus in the 1992 fiscal year. Imports increased by 12.5 percent in the 1992 fiscal year.

The economic environment of the market is very promising as the GDP per capita is very high which means that the consumers have great buying power.

(d) Population

The population of Japan in 1988 was 122,780,000 making it the 7th most populous country in the world and its population density is 300 people per square kilometre (Japaqn Statistics Bureau, 1992). There is a declining birth rate and the average life expectancy is long with about 11 percent of the total population over 70 years old (JETRO, 1992b). According to JETRO (1992a), the aging of the population will continue and by the year 2010, twenty per cent of Japanese society will be of the age of 70 years and above. These senior citizen will become a substantial consumption market.

(i) Japan Lifestyles

Since ancient times the JETRO (1991a) reports that the Japanese people have had an interest in the cultures of foreign countries and have a history of skilfully adopting products from abroad and making them their own. According to the report, modern Japanese life styles are a skillful combination of the foreign and the traditional, producing a
blend of East and West.

The average Japanese monthly income is ¥481,250 equivalent to U.S $3759.00 (JETRO, 1988a). The highest consumer expenditure is on food amounting to about 27 percent of total consumption expenses (1988a). It may be contributed to the pumpkin imports, as pumpkin is one of staples of the Japanese daily consumption. However, the demand trend will only continue to grow with decrease in domestic production and increase in population. Longworth (1983) reports that the prime force behind the diversification of Japanese eating habits has been the strong growth in real disposal income.

(ii) Employment Trends.

Japanese industry centred around agriculture early in the 1920s, gradually reducing to one-half in the 1930s (JETRO, 1988a). The old industrial structure underwent a major change in the 1950s as the beginning of an era of high economic growth (JETRO, 1991a). According to JETRO (1991a), the secondary production industries boosted production and sale and service industries expanded rapidly.

In terms of employment by sector, the most prominent feature is that most people are employed in the sales and services industries, followed by secondary industries and lastly by primary industries (JETRO, 1991a). This indicates that the Japanese workforce has moved from agricultural activities to other industries. Thus the domestic production of agricultural products, including pumpkin growing, may have
declined with increasing consumption due to population growth causes a demand for higher imports of pumpkins.

The Japanese Pumpkin Market

(a) How do Tonga Pumpkins Enter the Market?

Japan is one of the main trade partners of Tonga. In 1989 Tonga imported goods from Japan worth T$4.9 million or 7.2 percent of total imports. At the same time Tonga exported 17.4 percent of total exports to Japan and collected about T$2 million (Japan Statistics Bureau, 1992).

Although the Japanese market for pumpkins is very strict and complex, Tongan pumpkins entered the Japanese pumpkin market through a New Zealand marketing company in 1987 (Holo, pers. comm. 1992). From then until 1989 a pumpkin co-operative society known as the Tonga Growers Multi-purpose Co-operative Society Limited directly exported the pumpkins to Japan through a Japanese importer (Hon. Mailefihi, pers. comm. 1992).

From the conversation with Exporters, there were seven exporting companies exporting pumpkins to Japan of which three companies exported directly to their importers in Japan while four companies exported through their marketing agents in New Zealand.

(b) Japanese Market Culture

According to Morgan and Morgan (1991, p. 15), 'it is impossible to fully understand the Japanese economic
"machine" without first understanding the society that produced it. Modern Japan is still deeply rooted in its cultural origins. Morgan and Morgan (1991, p.15) point out that

\[ \ldots \text{dating back some two thousand years, the ways of} \]
\[ \text{the Japanese provide a foundation of continuity that is the basis for resiliency and adaptability} \]
\[ \text{in modern times.} \]

Traditions and business values have changed relatively little since the centuries ago. Japan is a culture where human relations and preservation of harmony are the most important element of society (Morgan and Morgan, 1991).

Morgan and Morgan (1991, p.15) further pointed out that

\[ \ldots \text{a combination of history and customs, geography} \]
\[ \text{and climate, religion and philosophy, and what some refer to as the "atmospheric pressure" of every day} \]
\[ \text{living have each come together to make the people} \]
\[ \text{of this small archipelago unique. And it is their unique sense of identity and destiny which gives} \]
\[ \text{their industrial machine its potency. Gaining an} \]
\[ \text{insight into these influences is a key first step} \]
\[ \text{to succeeding in the Japanese market.} \]

Each of these influences has contributed significantly to the formation of modern Japanese society, and to the making of Japan's economy. Understanding the underpinnings of Japanese society will give a framework to understand the workings of the Japanese markets (Morgan and Morgan, 1991).

(c) Japanese Consumers

Japan's market for consumer products is large, diverse and demanding (JETRO, 1992a). The Japanese are well educated and maintain a standard of living equal with that of other
industrialised nations. The market is demanding, since consumers have developed exacting standards regarding the quality of goods and services they will buy (JETROa, 1988).

The JETRO (1988a, 1991a) reports that the largest expenditure in the typical family budget is for food. Japanese consumers have a reputation for being very demanding about obtaining quality at reasonable cost (JETRO, 1983, 1988a).

(i) Trends in Food Requirements

At present, among the vast majority of Japanese, there is a strong tendency to look for a higher level of affluence and comfort (JETRO 1991a). Eating, as reported by JETRO (1988a), is no exception and Japan is becoming the land of a "hundred million gourmets". This trend has given rise to discriminating tastes, not just as to whether the ingredients are fresh or not, but also as to where they were produced and who produced them. Interest in health is also very high, and this has made health food and organically grown vegetables popular (JETRO, 1988a, 1991a).

(ii) Consumption Trends

The Annual Report on the Family Income and Expenditure Survey, reported by Tradescope (1992), shows that per household expenditure for fresh vegetables including pumpkin increased to 80,103 yen annually in 1990 from 73,417 yen in 1989. This increase of 9.1 per cent was due to an increasing demand for fresh vegetables as well as the high buying power of the Japanese consumers in respect to their income.
(iii) Consumer Preferences

Generally speaking, consumer tastes in vegetables are very conservative and it takes a long time for new varieties to penetrate the market (Tradescope, 1992). At the same time, consumer purchasing behaviour shows that consumers remain very price conscious, despite an underlying trend of growing demand for tastier vegetables. In some categories, consumer preferences are shifting toward vegetables which have undergone varietal improvement and have milder aromas than the originals. This trend is expected to continue in the coming years (Tradescope, 1992). Regarding the pumpkins the consumers prefer colour, taste, sugar content and good appearance.

(d) Situation of the Japan Market for Fresh Vegetables

(i) Demand and Supply Structure.

Table 21 presents the vegetable supply structure in the 1985-1989 period. According to Tradescope (1992), the net supply of leafy vegetables accounted for 41.7 percent, vegetable fruits including pumpkins for 33.4 percent and root vegetables for 28.8 percent.

The Tradescope (1992) reports that until 1969, domestic demand had been satisfied entirely by domestic production. Since then the domestic supply ratio has been showing a downward trend, falling below 95 percent every year since 1987.
Table 21: VEGETABLE SUPPLY STRUCTURE.

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic production (1,000 tons)</th>
<th>Imports (1,000 tons)</th>
<th>Net supply for domestic consumption (1,000 tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>16,455</td>
<td>866</td>
<td>17,320</td>
</tr>
<tr>
<td>1986</td>
<td>16,793</td>
<td>962</td>
<td>17,754</td>
</tr>
<tr>
<td>1987</td>
<td>16,721</td>
<td>1,114</td>
<td>17,831</td>
</tr>
<tr>
<td>1988</td>
<td>16,083</td>
<td>1,562</td>
<td>17,735</td>
</tr>
<tr>
<td>1989</td>
<td>16,235</td>
<td>1,502</td>
<td>17,735</td>
</tr>
</tbody>
</table>


The long-term outlook for demand and production of agricultural products is presented in Table 22. This shows that the annual consumption of vegetables per capita is expected to grow a modest 0.2 percent from 110.8 kilograms in 1987 to 111 kilograms in 2000 while total demand is forecast to grow 8 percent during the same period from 17.71 million tons to 19.16 million tons.

Table 22: LONG-TERM OUTLOOK FOR VEGETABLE DEMAND.

<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>1989</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross demand (1,000 tons)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net consumption per capita (kg)</td>
<td>110.8</td>
<td>111</td>
</tr>
<tr>
<td>Domestic production (1,000 tons)</td>
<td>16,600</td>
<td>17,570</td>
</tr>
<tr>
<td>Total supply for domestic consumption (1,000 tons)</td>
<td>17,710</td>
<td>19,160</td>
</tr>
<tr>
<td>Domestic supply ratio (%)</td>
<td>94</td>
<td>92</td>
</tr>
</tbody>
</table>

It is also estimated that domestic production of vegetables will increase from 16.6 million tons in 1987 to 17.57 million tons in year 2000. This means that the volume of imports could potentially grow from 1.11 million tons to 1.59 million tons.

The long-term outlook indicates that the ratio of domestic supply to total demand will decline from 94 percent in 1987 to 92 percent in 2000 (Tradescope, 1992). However, it has reported (JETRO, 1990a) that the ratio had already dropped to 91 percent in 1988 and 92 percent in 1989.

(e) Vegetable Imports

The importation of fresh vegetables is the result of a need to supplement domestic produce with imported produce and diversification and internationalisation of consumer tastes and eating habits (Tradescope, 1992). Japan's imports of pumpkins have been increased by 90.5 per cent from 1985 to 1990 period. The increase has been due to increasing demand as the domestic production has declined.

Table 23 also shows the top 10 vegetables imported on a volume basis to Japan from 1985 to 1990. Pumpkins are now the top imported vegetable on a volume basis. Pumpkin imports reached to 99,151 tons in 1990 compared to 15,449 tons in 1982 and 40,468 tons in 1985.

A majority of the main import items are vegetables which can be kept fresh during transportation. Recent improvements in technology for maintaining freshness have helped increase the
volume of imports. JETRO (1991b) reports that Japan's main suppliers included New Zealand with 22.5 percent of total, 22.2 percent to United States, 10.2 percent to Mexico and China 8 percent. The main vegetables exported by New Zealand and Mexico are pumpkins.

<table>
<thead>
<tr>
<th>Table 23: IMPORTS OF MAIN VEGETABLES.</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>123,807</td>
<td>141,729</td>
<td>125,876</td>
<td>240,560</td>
<td>206,381</td>
<td>235,82</td>
</tr>
<tr>
<td>Pumpkins</td>
<td>40,869</td>
<td>46,143</td>
<td>58,392</td>
<td>81,979</td>
<td>81,571</td>
<td>99,151</td>
</tr>
<tr>
<td>Onions</td>
<td>61,164</td>
<td>52,997</td>
<td>35,475</td>
<td>112,443</td>
<td>80,780</td>
<td>86,646</td>
</tr>
<tr>
<td>Asparagus</td>
<td>2,397</td>
<td>5,268</td>
<td>8,802</td>
<td>11,926</td>
<td>10,736</td>
<td>11,603</td>
</tr>
<tr>
<td>Broccoli</td>
<td>383</td>
<td>1,364</td>
<td>347</td>
<td>2,207</td>
<td>5,361</td>
<td>10,992</td>
</tr>
<tr>
<td>Garlic shoots</td>
<td>2,842</td>
<td>4,450</td>
<td>5,396</td>
<td>5,952</td>
<td>6,180</td>
<td>5,836</td>
</tr>
<tr>
<td>Garden peas</td>
<td>3,660</td>
<td>5,672</td>
<td>2,513</td>
<td>1,696</td>
<td>4,855</td>
<td>4,007</td>
</tr>
<tr>
<td>Carrots</td>
<td>54</td>
<td>8,860</td>
<td>2,165</td>
<td>799</td>
<td>1,101</td>
<td>3,280</td>
</tr>
<tr>
<td>Green soybeans</td>
<td>2,641</td>
<td>3,068</td>
<td>3,221</td>
<td>3,029</td>
<td>1,226</td>
<td>3,117</td>
</tr>
<tr>
<td>Okra</td>
<td>527</td>
<td>441</td>
<td>529</td>
<td>803</td>
<td>1,421</td>
<td>1,936</td>
</tr>
<tr>
<td>Cabbage</td>
<td>270</td>
<td>7,625</td>
<td>1,316</td>
<td>3,433</td>
<td>2,519</td>
<td>1,696</td>
</tr>
</tbody>
</table>

Source: Tradescope, 1992, Japan Fresh Produce Import, p.9.

(f) Domestic Production

Vegetables represent the most important sector in Japan's agricultural production, second only to rice and livestock (Tradescope, 1992). Table 24 shows the recent trends of domestic vegetable production. It indicates that the average volume of vegetable production remain relatively flat.

However, there have been shifts in the volume of production
of individual items due to the following factors, as reported by the Tradescope (1992):

1) Vegetable production is easily affected by weather.

2) Changes in production volumes are always accompanied by sharp fluctuations in market prices and as a result vegetable farmers face large risks.

3) The shortage of labour and the aging of the farming population in vegetable regions have been resulting in a reluctance to produce heavy vegetables such as pumpkins.

<table>
<thead>
<tr>
<th>Table 24: DOMESTIC PRODUCTION OF MAIN VEGETABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit: 1,000 tons</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Pumpkin na  na  na  245.5  252.6</td>
</tr>
<tr>
<td>Radishes  2,544  2,655  2,534  2,457  2,449</td>
</tr>
<tr>
<td>Cabbage   1,589  1,667  1,631  1,573  1,623</td>
</tr>
<tr>
<td>Chinese cabbage  1,478  1,513  1,432  1,309  1,334</td>
</tr>
<tr>
<td>Onions    1,326  1,252  1,307  1,251  1,269</td>
</tr>
<tr>
<td>Cucumbers 1,033  1,040  1,026  975  975</td>
</tr>
<tr>
<td>Tomatoes  802  816  837  775  773</td>
</tr>
<tr>
<td>Carrots   662  670  669  678  685</td>
</tr>
<tr>
<td>Others   1,812  1,856  1,883  1,773  1,863</td>
</tr>
</tbody>
</table>

Source: Tradescope, 1992, Japan Fresh Produce Import, p.12

According to the Tradescope (1992), domestic production has declined by 2.5 percent in the five years period from 1984 to 1989, and land under cultivation with vegetables, including pumpkins fell from 557,100 hectares to 538,000 hectares in 1989. This indicates a good prospect for future pumpkin imports.
(g) Situation of the Japanese Pumpkin Market

Although the Japanese categorise pumpkins together with other vegetables, the pumpkins have been treated by the consumers as one of their traditional stable foods (Tradescope, 1992). According to the Tradescope, the migration of young generations to urban areas leaving the aged people to do farming has a great impact on the decline of the domestic production.

Table 25 presents the annual pumpkin sales in Japan from 1988 to 1990. It shows that the total demand has increased by 4 percent or 12,999 tons in the three year period and that domestic production has declined by 5.5 percent or 11,199 tons from 1989 to 1990. Regarding pumpkin imports, Table 25 also shows that the imports increased by 21 percent or 17,399 tons from 1989 to 1990. This again reinforces the potential opportunity for pumpkin imports to the Japanese market.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic &amp; Imports</td>
<td>327,562</td>
<td>334,361</td>
<td>340,561</td>
</tr>
<tr>
<td>Monthly average</td>
<td>22,297</td>
<td>27,863</td>
<td>28,380</td>
</tr>
<tr>
<td>Domestic</td>
<td>245,584</td>
<td>252,609</td>
<td>241,410</td>
</tr>
<tr>
<td>Market share</td>
<td>75%</td>
<td>76%</td>
<td>71%</td>
</tr>
<tr>
<td>Imports</td>
<td>81,978</td>
<td>81,751</td>
<td>99,151</td>
</tr>
<tr>
<td>Market share</td>
<td>25%</td>
<td>24%</td>
<td>29%</td>
</tr>
<tr>
<td>Average price/kg (Yen)</td>
<td>145</td>
<td>126</td>
<td>159</td>
</tr>
</tbody>
</table>

(h) Pumpkin Imports Market

The Tradescopic (1992) reports that pumpkin imports have shown a sharp growth since the latter half of the 1980s. According to the Tradescopic, the increase in pumpkin imports is due to the success of the 'import development' method used by Japan by which the farmers overseas use seeds of pumpkin varieties suited to Japanese consumer preferences.

The seeds are supplied by the importers or a seed company in Japan. As a result imported pumpkins can now compete with the domestic pumpkins in terms of quality and taste. Table 26 provides the distribution of pumpkin imports amongst the export countries. New Zealand and Mexico are the two largest sources of pumpkins exported to Japan.

| Table 26: DISTRIBUTION OF PUMPKIN IMPORTS: 1988-1992 |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|
| New Zealand | 50,530 | 42,571 | 62,185 | 48,790 | 74,817 |
| Mexico | 24,221 | 33,260 | 27,294 | 25,081 | 27,770 |
| Tonga | 493 | 2,272 | 6,516 | 21,115 | 11,392 |
| United States | 6,164 | 2,714 | 2,995 | 4,775 | 6,174 |
| Australia | 0 | 0 | 18 | 772 | 815 |
| Fiji | 406 | 580 | 0 | 255 | 469 |
| Korea | 87 | 240 | 143 | 221 | 191 |
| Colombia | 77 | 107 | 0 | 0 | 0 |
| Vanuatu | 0 | 0 | 0 | 0 | 501 |
| New Caledonia | 0 | 0 | 0 | 0 | 58 |
| Total | 81,979 | 81,751 | 99,151 | 101,076 | 122,187 |

In 1992, New Zealand exported the largest market share with 74,817 tons or 61 percent of the total pumpkin imports, followed by Mexico with 27,770 tons or 23 percent. Tonga is the third largest export country with 11,392 tons or 9 percent of the total Japanese pumpkin imports in 1992. The trends of the total pumpkin imports increased markedly by 21,111 tons or 21 percent from 1991 to 1992.

**Niche Market for Tongan Pumpkin**

Tonga pumpkin exports have a seasonal niche among Japanese pumpkin imports. This seasonal pumpkin market is to supply the imports from November through January. In this period New Zealand and Mexico are off season in their pumpkin production, although the Mexican pumpkin season could be a potential partial competitor as its season could start earlier in December. However, Tonga has this niche market opportunity as its geographical location in the South Pacific gives it a climatic advantage for producing the pumpkins required by the Japanese market.

(a) **Tonga's Competitors**

Table 27 shows the Tonga niche market period in contrast to its potential competitors. In 1990, Tonga exported its market share starting in November through December. At the same time Mexico, the United States and Fiji had exported pumpkins to Japan.

Looking at the Tonga niche market period, the competitors which could be a potential threat to the Tongan pumpkin
industry are the United States and Fiji. To a limited degree, Mexico has potential to pose competition. However, it should be noted that the most threatening competitors to Tonga come from the South Pacific island countries, especially Vanuatu and New Caledonia. These two countries have recently entered the same market niche in 1992 through New Zealand marketing agents.

Table 27: JAPANESE PUMPKIN IMPORTS FOR OCTOBER-JANUARY 1988-1991
(AT WHOLESALE MARKET) Unit: tons.
A. 1988-1989

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th></th>
<th></th>
<th></th>
<th>Oct88</th>
<th>Nov88</th>
<th>Dec88</th>
<th>Jan89</th>
<th>Oct89</th>
<th>Nov89</th>
<th>Dec89</th>
<th>Jan90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>73</td>
<td>490</td>
<td>3,183</td>
<td>5,545</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1,386</td>
<td>5,308</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>-</td>
<td>-</td>
<td>1,229</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>943</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>617</td>
<td>4,321</td>
<td>978</td>
<td>168</td>
<td>60</td>
<td>1,319</td>
<td>988</td>
<td>166</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiji</td>
<td>-</td>
<td>-</td>
<td>406</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>580</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonga</td>
<td>-</td>
<td>-</td>
<td>493</td>
<td>576</td>
<td>-</td>
<td>-</td>
<td>1,696</td>
<td>1,344</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total 1690 4,811 5,061 7,518 60 1,320 4,650 7,841

B. 1990-1991

<table>
<thead>
<tr>
<th></th>
<th>Oct'90</th>
<th>Nov'90</th>
<th>Dec'90</th>
<th>Jan'91</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>68</td>
<td>58</td>
<td>1,955</td>
<td>3,998</td>
</tr>
<tr>
<td>United States</td>
<td>152</td>
<td>1,823</td>
<td>719</td>
<td>96</td>
</tr>
<tr>
<td>Fiji</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>254</td>
</tr>
<tr>
<td>Tonga</td>
<td>-</td>
<td>-</td>
<td>5,172</td>
<td>557</td>
</tr>
<tr>
<td>New Zealand</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5,212</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>1,891</td>
<td>7,846</td>
<td>10,117</td>
</tr>
</tbody>
</table>

Because Tonga's pumpkins are also available for the market in January, New Zealand should be considered as a partial competitor. Mexico and New Zealand start their pumpkin export season in December and January respectively. The Mexican season peaks in February/March while the New Zealand season peaks from February to April. Moreover, these two countries are exporting to Japan between December and June, when the weather conditions in Mexico and New Zealand are favourable for growing pumpkins.

The total demand structure of Japanese pumpkin consumption is highlighted in Table 28. Despite variation in the quantity supplied each month, the Table gives the pattern of the consumption capacity of the consumers. This demand structure can be used as a guideline to estimate the optimal market share for the Tongan niche market.

It is important to understand the demand and supply structure of the niche market and its potential competitors in order to avoid oversupply as well as to formulate a plan for a competitive marketing strategy to cope with the potential competitors. The Table shows that the domestic production supply in the market niche which Tonga pumpkins supply is decreased with increasing price.

(b) **Tonga Niche Market Share**

Table 28 further shows the total supply for the Tongan niche market period (November-January) from both domestic production and imports is 54,237 tons or 16 percent of the
total annual sale markets. This gives an average monthly supply of 18,079 tons of pumpkins to meet Japanese pumpkin demand during the niche market period.

Tonga can use this monthly supply as a guide so as to obtain a favourable price, because the demand falls during the niche market period even though the price is relatively high. In addition, the Tongan pumpkin industry should consider two options: either maintaining the high price of the market niche or capturing the maximum market share with an reasonable price.

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Quantity (tons)</th>
<th>Domestic Production</th>
<th>Imports</th>
<th>Wholesale Price (Yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>17,716</td>
<td>9,955</td>
<td>7,761</td>
<td>224</td>
</tr>
<tr>
<td>February</td>
<td>37,464</td>
<td>15,793</td>
<td>21,672</td>
<td>188</td>
</tr>
<tr>
<td>March</td>
<td>42,276</td>
<td>21,061</td>
<td>21,215</td>
<td>140</td>
</tr>
<tr>
<td>April</td>
<td>44,691</td>
<td>19,371</td>
<td>25,374</td>
<td>147</td>
</tr>
<tr>
<td>May</td>
<td>36,889</td>
<td>24,134</td>
<td>12,755</td>
<td>152</td>
</tr>
<tr>
<td>June</td>
<td>29,314</td>
<td>29,029</td>
<td>285</td>
<td>166</td>
</tr>
<tr>
<td>July</td>
<td>26,169</td>
<td>26,069</td>
<td>140</td>
<td>121</td>
</tr>
<tr>
<td>August</td>
<td>24,490</td>
<td>24,487</td>
<td>3</td>
<td>91</td>
</tr>
<tr>
<td>September</td>
<td>23,267</td>
<td>23,267</td>
<td>0</td>
<td>96</td>
</tr>
<tr>
<td>October</td>
<td>21,764</td>
<td>21,544</td>
<td>220</td>
<td>117</td>
</tr>
<tr>
<td>November</td>
<td>15,475</td>
<td>13,594</td>
<td>1,881</td>
<td>200</td>
</tr>
<tr>
<td>December</td>
<td>21,046</td>
<td>13,200</td>
<td>7,846</td>
<td>275</td>
</tr>
</tbody>
</table>

**TOTAL** 340,561 241,410 99,151


It should be realised that price elasticities are relatively large, but Japan's consumers are seeking cheaper
pumpkin, so that price competition among competitors is inevitable. Tonga can increase not only the quantity of export but also export earnings if it could reduce the prices by reducing the costs of production, marketing, and distribution as well as maintaining the quality standard.

Increasing the market share with a reasonable price seems logical as more farmers have a chance to grow pumpkin. This would allow more farmers to be involved thus contributing to income distribution among the broader farming community, rather than seeking a high price and only benefiting a few wealthier farmers.

(c) Price Structure

The importers have to make a contract with their individual exporters for a proposed market share and at the same time in that early stage of arrangement, a proposed wholesale price has to be negotiated on cost and freight basis (C & F price). According to the Investigating Team Report (Tonga Government 1992, p.28), there are three alternatives for price fixing:

* Determining a fixed price agreed upon well in advance of planting of pumpkins and/or shipping.
* Relying on spot market price, that is close to or about the time of shipping.
* Agreeing on a minimum and maximum range in advance with the final price to be determined close to or about the time of shipping

Most of the exporters prefer the third alternative for the price negotiation, so that the exporters have a second chance to bargain again for better price. The exporters need to be aware of the external competitors as well as monitoring the
market price situation through a consultation with the Japanese importers in order to be prepared for price bargaining.

Table 29 shows the fluctuation of wholesale prices during the month of December 1991. In comparison with the wholesale prices in Table 28, in case of Tongan pumpkins, there is a significant drop in price from 275 Yen per kilogram to 167 Yen per kilogram, a decrease of 108 Yen per kilogram or 39 percent. This substantial decrease was due to the oversupply of the niche market period by Tongan pumpkins.

(d) Pumpkin Imports Cost Structure

The exporters should realise that the costs involved in the operation of marketing by the importers, especially the costs involved in the handling of the pumpkins from the point of arrival to the wholesalers, will affect the net return to themselves, as well as the price to the farmers. These costs includes quarantine, custom fees, grading, repacking, packing materials, administration and transportation (Tonga Government, 1992). According to the Tongan Government report, the costs was estimated at 60 yen per kilogram in previous pumpkin seasons. Of course these costs will be lower if Tonga can only export good quality pumpkins which will minimise the costs involved with the importers.

Table 29 shows that the average wholesale price in December 1991 was 167 Yen per kilogram. Taking away the 60 Yen costs, this leaves only 87 Yen to 107 Yen to be shared by the
importer, wholesaler and Tongan exporter. If the market was not flooded, the average price would be much higher as indicated in 1990 price. On the 1990 price of 275 Yen per kilogram, after the deduction of the costs and exporters price of 110 Yen per kilogram, the importer gets a profit of 85 Yen.

The loss of 23 Yen represents the extra marketing costs involved for the importers in dealing with the low quality and under grade Tongan pumpkins, as well as the low prices of the pumpkins at the market. This was claimed by the importers as a loss for them as they have already paid the exporters.

Although the importers claimed some of their losses in the 1991 season, the most important factor indicated by this loss of 23 Yen is a signal to the Tongan exporters regarding price elasticity of demand. Thus, exporters should be cautious about the oversupply of the market share.

<table>
<thead>
<tr>
<th>Table 29</th>
<th>COMPARATIVE WHOLESALE PRICE Cost and C &amp; F Price 1990-1991</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit: Yen</td>
</tr>
<tr>
<td>December</td>
<td>1990</td>
</tr>
<tr>
<td>Wholesale price/kg</td>
<td>275</td>
</tr>
<tr>
<td>Wholesale costs &amp; commission/kg</td>
<td>20</td>
</tr>
<tr>
<td>Importers costs</td>
<td>60</td>
</tr>
<tr>
<td>Total costs &amp; commission/kg</td>
<td>80</td>
</tr>
<tr>
<td>Difference</td>
<td>195</td>
</tr>
<tr>
<td>Less C &amp; F price for exporter</td>
<td>110</td>
</tr>
<tr>
<td>Importers profit</td>
<td>85</td>
</tr>
</tbody>
</table>

The following scenario could be considered as a set of logical steps to be followed in setting the C & F price (Tongan Government 1992, p.21).

(i) The projected wholesale price per kilogram is used as a basis;
(ii) The wholesalers' costs and commission are deducted from (i) above;
(iii) The importers' costs are then deducted from the money resulted from (ii) above. This cost is estimated at 60 yen per kilogram;
(iv) The importers' commission is deducted from (iii) above;
(v) This would result in the C & F price. This C & F price can be negotiated up or down thereby reflecting on the importers' commission.

If Tonga wants to increase its pumpkin export volume there must be a sacrifice in the C & F price. However, an optimum level of quantity has to be considered within which the pumpkin industry can still be financially viable. One option is to investigate an alternative market or expand the market niche.

(e) Viable Price Structure for Tongan Exporters

To get an overview about the situation of the pumpkin import volume with regard the price structure, an analysis of possible prices at different C & F prices is crucially important so as to become a guideline to exporters as well as the farmers (Table 30). The analysis is based on the average marketable yield of 3.5 tons per acre.

The analysis indicates that, with the estimated costs and marketable yields, the lowest C & F price for the industry to be in marginal profit is about 85 Yen per kilogram. The C & F price of 100 Yen per kilogram at this current costs would be
a reasonable return for Tongan pumpkins.

<table>
<thead>
<tr>
<th>Table 30: ESTIMATION OF GROWER PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit: Seniti (cents)</td>
</tr>
<tr>
<td>C &amp; F Price/kg</td>
</tr>
<tr>
<td>Broker Commission 4%/kg</td>
</tr>
<tr>
<td>Freight costs/kg</td>
</tr>
<tr>
<td>Cost before Fob</td>
</tr>
<tr>
<td>Fob price/kg</td>
</tr>
<tr>
<td>Cost of bins/kg ($30/bin)</td>
</tr>
<tr>
<td>Operational expenses/kg</td>
</tr>
<tr>
<td>Profit to Exporter/kg</td>
</tr>
<tr>
<td>Total cost before grower price</td>
</tr>
<tr>
<td>Grower price</td>
</tr>
<tr>
<td>Cost of production/acre</td>
</tr>
<tr>
<td>Net to grower</td>
</tr>
</tbody>
</table>


(f) Importers

Table 31 shows the Japanese importers involved in importing pumpkins from Tonga in 1991. Tongan pumpkins are imported through two main ports in Japan. These are Tokyo and Kobe. The Japanese importers play a key role in import development.

In an effort to import pumpkin varieties suited to Japanese preferences, the importers recommend to the exporters the pumpkin varieties preferred by the consumers.

In addition, the importers sometimes provide technological guidance which helps exporters to produce good quality pumpkins required by the consumers in terms of shape, size and colour.
Table 31: JAPANESE COMPANIES IMPORTING PUMPKINS
FROM TONGA

<table>
<thead>
<tr>
<th>TOKYO</th>
<th>KOBE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. NYC International Ltd</td>
<td>8. Tominga Boeki Kaisha Ltd</td>
</tr>
<tr>
<td>7. Tokyo Maruichi Shoji Co.Ltd</td>
<td></td>
</tr>
</tbody>
</table>


(g) Distribution Channels

There are two distribution routes for imported pumpkins, one which includes central wholesale markets and one which bypasses the central wholesale markets. In Japan, 90 percent of vegetables including pumpkins are distributed through wholesale markets (JETRO, 1991b). Fig 1 shows the general distribution channels, and Fig 2 shows the distribution route which bypasses the central wholesale markets. As the pumpkin import trend increased the importers tended to prefer the approach indicated in Fig 1. This is because the shortcut route can avoid potential risks resulting from severe fluctuation in auction prices at the
central wholesale markets (Tradescope, 1992).

**Fig 1: DISTRIBUTION CHANNEL THROUGH WHOLESALE MARKETS**

- IMPORTERS
- RECEIVING AGENT
  - PRIMARY WHOLES
  - MIDDLEMEN
    - AUTHORISED BUYERS
      - RETAILER
      - CONSUMERS


**Fig 2.**

**DISTRIBUTION CHANNEL WITHOUT GENERAL WHOLESALE MARKETS**

- IMPORTERS
  - LARGE RETAILERS
    - CONSUMERS

Some leading Supermarket chains in Japan, with nationwide sales networks (JETRO, 1991b), are currently trying to expand procurement of fresh vegetables such as pumpkin from overseas. The biggest advantage of imported pumpkins for these supermarket chains is stable supply, especially in the off season or at times when market prices are soaring (Tradescope, 1992).

The distribution route which includes the central wholesale markets which involves sales and purchases by auction and under a bidding system involving large buyers and sellers who are registered with the central wholesale market.

After custom's clearance, the imported pumpkins are delivered to receiving agents or domestic processors who are responsible for grading and packaging. In the retail industry, supermarkets and small grocery stores function as the main distribution route for pumpkins.

The increasing role played by large supermarkets is having a significant impact on the distribution of pumpkins. This will lessen the role of auctions in price formation, resulting in a cost saving incurred by central wholesale markets. This bypass does not mean that the large supermarkets with nationwide networks are moving away from the wholesale market completely. Their policy is to use central wholesale markets on a case-by-case basis when necessary to ensure the procurement of a sufficient volume of pumpkins (Tradescope, 1992).
(h) **Standard Requirements**

The Tradescope (1992) reports that the standard requirements for imported vegetables are more complex in Japan than in other countries. For example some vegetables such as cucumber are divided by kind and size into 13 classes by the importers. Retailers purchase cucumbers for their customers from among the 13 classes of cucumbers from the Supermarket. In the case of pumpkins, they are divided into 5 classes as shown in Table 32 (Tradescope, 1992).

The fewer counts (or number of fruits per carton) indicates the best quality grade with high price. The wholesale and retail prices vary depending on the size, colour, ripeness and place of origin (Tradescope, 1992).

<table>
<thead>
<tr>
<th>Number of fruits per 10kg carton (Counts)</th>
<th>Average wt/fruit</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5</td>
<td>2.2 kg</td>
<td>High</td>
</tr>
<tr>
<td>6-7</td>
<td>1.5 kg</td>
<td>Good-High</td>
</tr>
<tr>
<td>8</td>
<td>1.25 Kg</td>
<td>Marginal-Good</td>
</tr>
<tr>
<td>9</td>
<td>1.1 kg</td>
<td>Marginal-Bad</td>
</tr>
<tr>
<td>10 or more</td>
<td>1.0 kg or less</td>
<td>Bad</td>
</tr>
</tbody>
</table>


According to the Tradescope, in pumpkin imports, the component ratio of the size required has very much to do with the profit and loss for the importers. Thus it is necessary
to realise that the size of pumpkin fruits are very important during production and price negotiation.

This is an important area if an exporting company attempts to brand its pumpkins in order to be recognised by the importers as well as the consumers and place the company in a strong competitive position in the market place. The same time the exporters should further investigate the possibility of processing the undersized fruits.

(i) Import Regulations

(i) Plant Quarantine

Japan is very strict with quarantine regulations. This is because Japan wants to protect its agricultural industries from any economically significant diseases and pests which do not occur in Japan.

A phytosanitary certificate must be issued by the government quarantine agency of the export country to accompany with the imported pumpkins. In principle, inspections are conducted by sampling prescribed amounts according to importer, kind of fresh vegetables, producing country and exporter. When diseases and/or pests are found during an inspection measures for disinfection or destruction are ordered.

Fumigation is widely applied because a large volume of pumpkins can be treated at one time. Sometimes different fumigants are used depending on the species of insect. Fig 3 presents the quarantine procedure for pumpkin imports.
JETRO (1991b) reports that for fresh vegetables such as pumpkins, there are no mandatory standards as in processed food. The absence of standards has been based on the belief that the quality and freshness of pumpkins can be easily determined by the appearance of the pumpkins. Thus labelling may be relatively unnecessary. However, the Japan Agriculture Standard Association has formulated General Quality Labelling Guidelines for fresh vegetables including pumpkins,
which took effect on 1991 (JETRO, 1991c).

The Quality Labelling must be clearly shown and adhered to by the exporters. According to the Tradescope (1992, p.17), the consignment must be exported with the following:

i. product name and variety;
ii. production country of origin;
iii. name of exporter, shipper and importer;
iv. weight; and
v. size/grade.

(ii) Requirements

In general, careful field control, sorting and preparation before shipment are recommended for pumpkin imports. Insect pests such as spider mites, foricid moths, nooctuid moths, thrips and armoured scales have often been found on pumpkins.

To prevent infestation by such pests, measures such as cleaning the pumpkins are necessary. There have been cases where large lots of pumpkins were ordered sorted and/or destroyed due to the rot caused by fungi (Penicillus and Fusarium). This can pose a large problem, not only a loss to the exporters, but also to Japan as there is insufficient capacity for disposal.

Conclusion

Analysing the market and its environments shows that the market niche for Tongan pumpkins is a potential opportunity for the pumpkin industry.

Based on this analysis, which has revealed the situation and potential of the Japan pumpkin market, the next chapter will
discuss the marketing concept and marketing management functions in relation to the marketing approach appropriate for the Tonga pumpkin exports. Some strategic issues concerned with the marketing process of the industry will also be discussed.
CHAPTER 5

THE MARKETING APPROACH AND STRATEGIC ISSUES IN MARKETING OF THE INDUSTRY

Introduction

Marketing and marketing management skills have emerged as the main issues of concern during this inquiry. Because the pumpkin industry is an export industry, marketing concepts and marketing management principles have to be understood by the people involved in the industry, particularly by the exporting companies. For this reason the theory of marketing and marketing management are discussed in this chapter in relation to agricultural marketing particularly the marketing of the industry. Because marketing deals with the exchange process which is concerned with the satisfaction of consumers as well as profit making for the marketers, marketing is critical to the success or failure of any product, or even of the companies as a whole. Understanding marketing and its functions, will help to improve the development of this export market. Some strategic issues concerned with the marketing of the industry are also discussed.

What is Marketing?

The American Marketing Association (cited by Kinnear and Bernhardt, 1990, p.7) defines marketing as:
...the process of planning and executing the conception, pricing, promotion, and distribution of ideas, goods and services to create exchanges that satisfy individuals and organisational objectives

According to Kinnear and Bernhardt, marketing is an important and dynamic subject as it affects our daily lives as well as the society we live in, and the success and failure of all organisations. It is dynamic because it operates in the real world, which is constantly changing. It is important for exporters to understand this as they deal with the export market and they have to understand the real situation of the marketing environments in order to facilitate the marketing process.

To expand the definition of marketing, Kotler et al. (1989, p.17) defines marketing is a 'human activity directed at satisfying needs and wants through exchange process'.

Abbot (1984, p.1) defines agricultural marketing as:

...the movement of agricultural produce from the farm where it is produced to the consumer or manufacturer. This includes physical handling and reduce wastage, grading and quality control to simplify sales transactions and meet different consumers' requirements.

Baker (1989, p.9) points out that there are three elements which must be present in order to define an food marketing situation including:

1) two or more parties potentially interested in exchange;
2) each party possesses things of value to the other(s);
3) each party is capable of communication and delivery
However, the definition of marketing which is most applicable to agriculture is given by Kohls and Uhl (1980, p.8):

[Marketing is the performance of all business activities involved in the flow of agricultural produce and services from the point of initial agricultural production until they are in the hands of the ultimate consumer.

This definition indicates how different groups with different interests and needs view marketing from different perspectives. For example, according to Kohls, the customers look for what they want at the lower price while the farmers try to obtain the highest possible returns. Therefore an understanding of any marketing situation must be recognised particularly from the farmers' view point so that production planning is aimed at demand of consumers.

According to Kohls and Uhl (1990) food marketing is a connecting link. In the case of the pumpkin industry, the exporters are a bridge between the farmers and consumers. It is both a physical distribution and an economic bridge designed to facilitate the movement and exchange of agricultural produce such as pumpkins from farmers to consumers.

The Marketing Concept

According to Hatton and Oldroyd (1992, p.7)

... marketing's roots lie in economics as both disciplines are about people and markets and are concerned with consumer behaviour and the study of the exchange process.

The concept of marketing is a very recent development in the arena of business (Papantoniou, 1992). Kotler (1989),
Ansett (1989) and Papantoniou (1992) define the essential concept of marketing as satisfaction of customers' needs. According to Baker (1982), Papantoniou (1992), Hatton and Oldroyd (1992), the marketing concept requires a focus by a business enterprise on the needs and requirements of customers. In other words, if the exporting company does not produce what people want to buy, that company will go out of business.

This approach should be contrasted to the common practice of producing goods and then selling them, without planning production specifically to the needs of customers.

Cohen (1988), Kinnear (1989) and Kotler et al. (1989) describe the marketing concept as a "customers' orientation". The idea is that producers such as the exporters and farmers in an industry should do an analysis of the needs of customers and then make decisions designed to satisfy these needs through producing a quality standard required by the consumers.

According to Cohen (1988) and Kotler et al. (1989) the marketing concept introduces the marketing person at the beginning rather than at the end of the production cycle and integrates marketing into each phase of the business. It should be noted that it is not what the producer wants to sell but what the customer wants to buy, that is crucially important. Thus, a company with a marketing orientation seeks to find a need and to fill it (Cohen, 1988).
Thus, the marketing concept involves focusing on consumer needs, integrating all activities of the company to satisfy these needs as well as achieving long-run profits. Foster (cited by Baker, 1982, p.19) describes the marketing concept from this perspective:

[M]arketing requires executives to be in a frame of mind that realises if there are no customers there is no business. It does not matter how fancy, complex or academic marketing and other management systems may be, if a company cannot attract customers' business it will eventually be forced into liquidation.

To summarise what the marketing concept is all about. It is a business philosophy and an attitude of management that puts the customer first and forms the foundation of a marketing approach to business through a strategic marketing plan. Truelove (1991, p.1) points out that a strategic marketing plan is an attempt 'to look at the overall field position and judges the best way to enhance sales in the context of the hostile environment.' This means that the marketing strategy of a company is its overall plan to achieve sales and profit. (A detailed outline of a model strategic marketing plan is at Appendix A).

The Evolution of Marketing Concept

The marketing concept or "customer orientation" has been introduced recently at a time when the "production orientation" and "selling orientation" approach is no longer effective in the market place. The idea of a production orientation, according to Potts (1986a), is that the firm's planning, aims to increase the efficiency of the production
unit to optimise the production. Thus, the focus of the firm is not the customers' needs but the product to be produced. Hatton and Oldroyd (1992) describe production orientation as a management approach based on a primary concern with the product.

A production orientation is applicable when demand is higher than the production capacity. According to Kinnear (1989), the production concept holds that the customers' will favour those products that are available and highly affordable as well as cheap, and therefore management should concentrate on production development.

Sales orientation, described by Cohen (1988), takes the product as a given and tries to sell the product to the consumer. The notion behinds it is that a company with a good sales person can sell anything to anyone.

The shortcoming with this concept is that the customers' needs are not considered in the selling strategy. Thus, it is based on the sales management approach involving product differentiation, promotion and advertisement with an experienced salesman.

As we can see the sales concept is the reverse of the main feature of the marketing concept. As Potts (1986a) reports, by 1950 companies in the United States had come to recognise that personal selling and advertising of goods produced was not what consumers really wanted and resulted in goods being abandoned.
According to Potts (1986a), this is the entry point to the marketing concept as the marketers or producers focused their attention on the consumers' needs. Potts further points out that

these needs were measured and transferred as an instructions for the production unit. And that is why the marketing concept had emerged as a tool to be utilised by all the successful business enterprises (Potts, 1986a, p.9)

Successful companies now follow the marketing concept of making what can be sold according to the market demands, rather than the approach of selling what the companies can produce.

As we can see, the marketing orientation is a relatively new concept particularly to the agricultural enterprises in the developing countries such as Tonga. Therefore, there is a need for a marketing expertise to improve export performance of the industry. As Potts (1986a) stated, Australian rural industries had just started (by 1986) to recognise the deficiencies in their marketing and begun to acquire marketing expertise to improve export performance.

The Tongan pumpkin exporting companies have exhibited deficiencies in their marketing of the industry. Essentially, they have focused on a selling orientation instead of customer orientation. The emphasis should be focused on what the consumers want and on planning production development to produce quality pumpkins to meet that want.
The Marketing Management

Marketing management principles also need to be understood by the exporters of the industry so that they can effectively implement the marketing process. But what is marketing management? Marketing management is described by Kotler et al. (1989) as the conscious effort to achieve desired exchange outcomes with target markets. According to Kotler et al., marketing management deals with how an organisation and individuals can improve their exchange activities to produce more income for themselves and more satisfaction for customers.

Cohen (1988, p.11) defines marketing management as:

...the analysis and planning leading to selection of one or more market targets, the design of an integrated marketing strategy to reach selected market targets, and implementation and control of plan strategy to achieve corporate marketing objectives.

In other words marketing management is the management of marketing activities such as production, pricing, promotion and distribution which is known as "marketing mix".

Marketing management is a process which consists of five main tasks stated by Kotler et al. (1989) as in Table 33.

Thus, marketing management can be characterised by five basic functions. These are planning, organising, coordinating, controlling and appraising the marketing process and its operation. These functions should be the main tasks and responsibilities of the exporting companies of the pumpkin industry.
### Table 33: MARKETING MANAGEMENT PROCESS

1. Organising the Marketing Planning Process  
   * Strategic Planning  
   * Marketing Planning  
   * Marketing Research  
   * Information System

2. Analysing Marketing Opportunities  
   * The Market Environment  
   * Consumer Markets  
   * Organisational Markets

3. Selecting Target Markets  
   * Measuring and Forecasting Demand  
   * Market segmentation, targeting and positioning

4. Developing the Marketing Mix  
   * Designing products  
   * Pricing products  
   * Placing products  
   * Promoting products

5. Managing the Marketing Effort  
   * Competitive Marketing Strategy  
   * Implementing, organising and controlling marketing programs.

Source: Kotler et al. 1989; Marketing in Australia, p.33.

### The Marketing Mix

Market development in agricultural marketing refers to the wide range of marketing activities designed to enhance the value of food products for consumers (Kohls and Uhl, 1980). These marketing activities are called marketing mix. Kotler (cited by Potts, 1986b; and Baker, 1989) defines marketing mix as the particular blend of controllable marketing variables that the experior uses to achieve its objective in the target market. These marketing mix variables have been classified by Kotler et al. (1989) into four major groups.
including 'the product, price, place and promotion, or the Four Ps'.

Each of four Ps stands for a whole range of activities that relate to the operation of marketing process. (Potts, 1986b; Kotler et al. 1989; Baker, 1989) proposed a scheme for those various factors and called it the Elements of the Marketing Mix' (Table 34). The list of elements of the marketing mix will vary with the nature of the product. For example, in agricultural products, quality will include some specific factors important to the consumer. For example, pumpkin quality refers to the preferred variety, ripeness, sugar content, standard weight and appearance of the fruits. Thus, the exporters have to make sure that their farmers produce pumpkins consistent with the above qualities which is what the Japanese consumers want. It is vital to maintain these elements of the marketing mix in the marketing process in order to secure the market for the industry.

The marketing mix variables are the internal controllable elements of the marketing process and act as tools to facilitate the marketing concept. The exporters's task is to plan and utilise the variables which may contribute to the development of the niche market of the pumpkin industry such as quality control, marketing information, advertising through branding, market researching and transportation.

Because these elements are internal, the exporters have to manage them effectively so as to achieve the company's goals as well as reducing the costs. However, these internal
marketing variables cannot function independently without adjusting to the marketing environment which is beyond the control of the exporting companies.

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Source: Baker, 1989; Agricultural Marketing, p.27

The Marketing Environment

Baker (1989) and Potts (1986b) describe the marketing environment as those forces which are uncontrollable because they are external variables which are outside the control of the business operation. According to Potts and Baker, the variables of the marketing environment include:

1) demographic forces; 2) economic forces; 3) ecological forces; 4) technological forces; and 5) political forces.
The marketing environment variables affect the marketer in three ways. Baker (1989) points out that the marketing environment influences consumers through their lifestyles, standard of living and preferences for products. It also affects the decisions of marketing managers in some marketing activities through such elements as packaging laws, price controls and health regulations. The other effect of the marketing environment is its influence on consumers' reactions towards the firm's marketing mix.

According to Baker (1989), the marketing environment is not a static force. The variables are interrelated and can be easily changed. The changing environment can cause a degree of uncertainty and affect the company's marketing plans. On the other hand they can create marketing opportunities for the companies.

Regarding the operation of the marketing of the pumpkin industry, one of the shortcomings of exporters is the lack of understanding of the marketing environment variables of the pumpkin exports to Japan. This is particularly important to the preferences and life style of the Japanese consumers. In addition, the exporters would be required to understand the marketing regulations and requirements regarding packaging and health. Examples of this are the maximum permitted level of chemical residue in the fruit and the number of days required for the pumpkins to reach Japan after the harvest. These marketing environment variables look unnecessary to some exporters but they are critical in long
term development of the company's position in the niche market.

Through understanding of the influences made by the external variables, exporters can continually monitor changes in the environment and can make changes to their marketing strategic plan to maintain a competitive position in the market. In addition, such changes can provide opportunities for further expansion of the market niche of the pumpkin industry.

Niche Marketing

(a) What is Niche marketing?

A niche market is a demand by customers which has been identified in a market and which is not very important to the main suppliers of that market. Niche marketing has been recognised by many small business organisations as an opportunity to be successful in business.

Cohen (1988, p.375) defines niche marketing as:

...a distinguishable market segment identifiable by size, needs, and objectives, and seeking to concentrate on fulfilling the needs of this niche.

In the context of the pumpkin industry, niche market is an unique market in which needs are not currently filled by the main suppliers of Japanese pumpkin imports. This niche is carved out of the larger market dominated by giants (such as New Zealand and Mexico) when the small competitor (such as Tonga) can identify the needs of this niche and serve it better.
According to Cohen (1988) and Kotler et al. (1989), an organisation practicing a niche marketing strategy may be small, but in the niche it is 'king' and concentrates its resources in the niche and in controlling the segment of the market.

(b) Characteristics of the Niche Market

Kotler et al. (1989, p.627) present the characteristics of a niche market as follows:

...it is of sufficient size and purchasing power to be profitable; it has growth potential; it is of negligible interest to major companies; it can be served effectively by the firm's skills and resources; it allows the firm, through building consumer goodwill, to defend it against attacking from major competitors.

A niche market, according to Kotler et al, is more profitable and free of the agonies of endless competition. Papantniou (1992) states that a niche market has to display some growth potential to render it viable. However, usually niche products have a short life expectancy.

Specialisation is the key idea in niche marketing (Kotler et al. 1989). According to Kotler et al., low share companies can be as profitable as their large competitors. Another aspect is described by Richardson (1991) as 'selling big by selling small.' According to Richardson, most large markets evolve from niche markets. This is because niche marketing teaches many important lessons about customers. Richardson (1991, p. 22) further suggests that niche marketing depends 'on word-of-mouth references and
infrastructure development, a broadening of people in related industries whose opinions are crucial to the product's success.'

(c) Niche Market Strategy

A company must choose its strategies based on its industry position and its strength and weaknesses relative to competitors. The strategy must change to meet changes in the competitive situation (Kotler et al. 1989). According to Kotler et al., it is important for the niche marketer not to be afraid to compete in a market dominated by market giants, because it has chosen to compete on its own terms.

Because a niche market is a specialty market niche, there are needs not yet satisfied. Thus, a special marketing strategy, according to Kotler et al., requires skills which are unique and different, and which aim to satisfy those needs.

Exporters to a niche market have to be aware that a successful niche market becomes larger, and therefore becomes more attractive to large competitors (Kotler et al. 1989).

Cohen (1988) points out that a large market share is not necessary for success in the market place. However, to succeed with a small market share, Cohen presents four rules for success:

1) careful market segmentation;
2) efficient use of research and development funds;
3) satisfaction in remaining small in the market chosen;
4) persuasive influence of the chief executive throughout the organisation (Cohen, 1988 p.59).

Competition for a market share should be considered carefully because the expansion of a market share is usually coupled with the goal of dominating the market.

It should be realised that a high share is not required for high profitability, but getting a high market share does have advantages. However, it should be realised by the exporters that it is necessary either to expand the market share or concentrate on the low market share to improve profitability as well as reliability.

In the development of the pumpkin niche market, the exporters must concentrate on the current market share to establish Tongan pumpkins in the market before further expansion. The marketing approach will depend on the needs of the export markets and it cannot be assumed that a marketing strategy that works in one market will work elsewhere (National Executive of Small Business Agencies (NESBA) and the National Industry Extention Services (NIES), 1992).

(d) Potential Niche Markets for Tonga

Tonga has a competitive advantage in different types of niche markets. However, finding and developing these niches is difficult and it requires effort and skill to develop these niche markets. In the last two decades, Tonga has operated some niche markets in New Zealand. However, these niche markets have deteriorated due to the insufficient niche marketing skills developed by the exporters.
The study done by the World Bank (1990) reports that there are three potential niche markets for Tonga, but there is a need to improve the marketing skill of marketing organisations so as to develop these niche market opportunities. The three niche markets are:

(i) Ethnic Market Niches.

Although, Tonga's rootcrop production depends on the domestic market, Tongans who have migrated overseas create an ethnic market niche for the rootcrops such as yam, taro and cassava. This is because overseas Tongan communities still have strong demands for traditional foodcrops.

(ii) Quality Market Niches.

Because Tonga is a small nation and far from major overseas markets, quality niche markets such as the current niche in cured vanilla products can be further exploited. Vanilla is a high value crop with less volume and premium quality cured vanilla has found a niche in Europe and United States. However, management at the farm as well as quality standards must be improved to protect its position in the niche markets.

(iii) Seasonal Market Niches.

Seasonal market niches have been operating in Tonga for quite sometime particularly the niches in the New Zealand vegetables import industries. Watermelons and vegetables are usually exported to New Zealand on a seasonal basis.
Tonga has the climatical advantage in pumpkin growing to bridge the niche identified by the New Zealand marketers in the Japanese pumpkin market. Although the seasonal market niche is very short, Tonga should concentrate in developing this market opportunity to its optimum capacity before looking further for expansion. In addition, further investigation is required for potential market niches for the other crops in addition to pumpkins.

(e) S.W.O.T. Analysis of the Pumpkin Niche Market

Understanding the situation of the market niche is vital for both the exporters and the decision-makers in the pumpkin industry so they can plan the production process according to the requirements of the market. It also allows the marketers to take note of the position of potential competitors.

S.W.O.T. analysis can be used to identify the Strengths, Weaknesses, Opportunities and Threats affecting the development of the industry including its potential competitors. Flavel (1992) states that 'SWOT analysis' is a basis for risk assessment. Macdonald (1989) describes S.W.O.T. analysis as a device which helps to identify and pin down the real issues which should be addressed in the future as matters of priority.

In this regard, the author applies S.W.O.T. analysis to identify the internal strength and weaknesses of the industry development. The O and T refer to the opportunities
and threats from the industry's external market niche environment and its potential competitors. This analysis is based on observation and information collected during the research.

**Strengths**

- The product can be produced profitably in good soil and favourable weather conditions.
- The government has recognised and started to improve its support services particularly in marketing and research.
- Improving quality standards has been taken as the priority in developing the industry.
- Funding for industry development is readily available.
- Tonga has more experience in this industry compared to its potential competitors.

**Weaknesses**

- Tonga is very far from the market place, incurring high costs of transportation.
- Most of the Tongan farmers lack skills in management of this type of agricultural enterprise. This will contribute to an increase in the costs of production as well as a deterioration of the quality standard.
- The quality standard is not consistently maintained.
- Technology transfer is not effectively delivered to farmers.
- Limited land is available for future expansion of the industry.
- Insufficient marketing skills have been acquired by the exporters.
- Insufficient marketing infrastructure.
- Lack of market information.
Opportunities

There is a demand in the market niche provided Tonga exports high quality pumpkins.

Tongan pumpkins are preferred by consumers because of their good taste and high sugar content.

The buying power of the Japanese consumers is high.

The pumpkin is one of the important traditional staples for the Japanese population.

Japanese Domestic production is declining, thus pumpkin imports have increased substantially.

The population is large and creates a large market.

The political system in Japan is stable.

Threats

There are potential competitors. They have just started to attack the same market niche. The production process is developed and supervised by experienced exporting companies.

The taste of consumers may change to other substitutes or other pumpkin varieties which may not grow well in Tonga.

The virus disease problem may not be able to be controlled which will substantially reduce yield as well as increasing production costs.

Exporting low quality pumpkins may cause a ban on Tongan pumpkin exports by the Japanese importing companies.

How can the Pumpkin Exporters be Successful in the Japan Market?

It has been recognised during the inquiry that most of the exporters do not have sufficient knowledge regarding the business culture of the Japanese, particularly how to negotiate with the Japanese importers (or commission agents) for market share contracts and the C & F price. This has been
indicated by the involvement of the Exporting Companies from New Zealand in negotiation for some Exporters in Tonga.

The Tongan pumpkin is exported to Japan through Commission Agents. The Agent takes the pumpkins and negotiates sales with major chain store buyers or with small retailers. Tongan exporters need to recognise the importance of negotiating successfully with Japanese businessmen. This is vital as most of the Tongan exporters have not yet negotiated directly with the Japanese importers. The exporters must first establish a personal relationship with the Japanese importers before beginning business talks and negotiations for market share contracts (JETRO, 1990a).

The niche market of the industry will not be successful in the long term until the Tongan exporters have established a mutual understanding with their importers. Establishing this relationship will become an entry point for direct negotiation between the Tongan exporters and the Japanese importers. This will avoid the extra commission charged by the New Zealand Marketing companies which negotiate for market share on behalf of some Tongan exporters.

In this regard, the following discussion will focus on some characteristics and the basics of doing successful business with the Japanese. Because most of the Tongan exporters have just entered to exporting industry, an understanding of the
Japanese business culture is vital for them in order to promote the Tongan pumpkin industry.

What the Exporters should know about the Japanese?

According to Morgan and Morgan (1991), Japan is a nation with a sense of mission at all levels of society as well as at in walks of life; 'its people think more intensely and expansively about business possibly than other people on earth.' (Morgan and Morgan, 1991 p.42)

Due to the lack of understanding of the exporters of the nature of the Japanese pumpkin market and its consumers, they tend to give the Japanese importers little consideration.

Morgan and Morgan (1991, p. 52), point out that:

Japan operates on a "hierarchy of needs" philosophy aimed at acquiring through commerce only what it cannot supply for itself, principally natural resources, fuel and food. Japanese markets aim to benefit Japanese society.

It is an important principle that Japanese businessmen are prepared for slow growth in business for the sake of long term success rather than pushing for high profit in the short term (JETRO, 1985; 1988b). It is obvious from the current performance of most of the exporters that they want high profit in a very short period of time without trying to establish the Tongan pumpkins in the Japanese market. This is the main weakness of the exporters in the development of the industry.
The exporters have tried to increase market share as well as pushing for high prices after only a few years of dealing in business with the Japanese importers. This was done without understanding the Japanese business culture as well as not establishing personal understanding with the importers through effective communication (JETRO, 1992d). Lack of communication can be one of the biggest impediments to effective performance with Japanese companies (Morgan and Morgan, 1991).

According to Morgan and Morgan (1991), there are some aspects in the Japanese business culture which people who do business with the Japanese should be aware. The main points are that Japan businessmen need a uniform Organisational structure, person to person contact and an appreciation of cultural differences (JETRO, n.d.a).

According to Morgan and Morgan, the key to success in Japan's market are:

Revering the "Customer as God" Japan is very cautious about the customers' needs; controlling your own destiny—building a strong team of key people and then assuring and providing them full support are the key prerequisites to long term success in the Japanese market; researching; building a competent organisation and management; be aware about the human relations—trust, obligation and respect for human side are the foundation of business in Japan (Morgan and Morgan, 1991, p.227).

It should be noted by the exporters that the Japanese are more interested in the long term benefits of relationships rather than the revenue from a specific contract, and are
very attuned to the idea of reciprocity and interdependence with close partners (Morgan and Morgan, 1991).

The exporters of the pumpkin industry should be aware of the basics in understanding the business culture of the Japanese. The Japanese External Trade Organisation (JETRO, 1985 p.3) points out some basics for understanding and dealing with Japanese business culture:

. Keep "export thinking in mind."
. Show that you have an export mind.
. Appoint yourself "the man in charge of export."
. Build an export team.
. Train all export team members to master the basic export documentation.
. Take a trip to Japan for familiarisation but not for business negotiation.
. Try to take a look at how the Japanese people live.
. Think for long term commitment to the Japanese market means that you are willing to allow five years for sowing and growth with an eye to reaping profit from the sixth year on.
. Cooperate with your Japanese importer to produce a Japanese version of your products.
. Modify your product to Japanese market requirements.
. You must maintain the quality of your product.
. You should appoint only one company as your importer.
. Changing importers too often can be harmful.
. Do not settle for a second best in mutual communication—mutual communication is vital.
. Consider the possibility of getting a trial period.

Understanding the business culture as well as knowing how to establish a business relationship with a Japan businessman is necessary in order to enter Japan's business arena (JETRO, n.db).
Strategic Issues Concerned with the Marketing Approach in the Industry

(a) Issues concerned with competition amongst exporters

There have been concerns in the government and the exporting companies regarding open competition amongst exporters for a market share in the niche market. Due to the lack of understanding by the exporters of the niche market, some exporters tend to compete for short term profit rather than trying to establish Tongan pumpkins in the Japanese pumpkin market for the longer term, as well as protecting the Tongan position from other external competitors. The fact is that open competition in a limited market is critical for the benefit of the farmers and the Tongan economy as a whole.

The current situation of the niche market is that its total market share is small and limited. This is the main justification for issuing export licences and limiting market share to each exporting company. However, this can become a motivation for exporting companies to formulate a competitive strategy for their marketing process. Enforcing the selection criteria will also allow the export companies to further invest in marketing facilities to improve their marketing performance for quality standards.

Although there is open competition among the exporting companies in Tonga, each exporting company needs to be focused on formulating a strategic marketing plan to protect
its position in the Japanese market, owing to the threat posed by external competitors. As Kohls and Uhl (1980) suggests, both large and small companies must formulate strategies that place themselves against competitors in their market.

The exporting companies in Tonga should consider a strategy where each company can concentrate on a particular aspect of quality product differentiation rather than increasing their market share. Porter (cited by Kotler et al. 1989) suggest that there are some generic positioning strategies that companies could follow such as production differentiation through branding.

Branding is defined by Kotler et al. (1989, p.88) as 'the method used by marketers to make products recognisable and unique through special name, symbol or design.' The exporting companies in the pumpkin industry should consider the "brand strategy" to apply to their pumpkins as has been done in other countries to fruits like banana and apples. This product differentiation identifies the fruit as a quality pumpkin. This will not only attract the consumers to the pumpkins but also put that company in a better competitive position in the market as well as fetch higher prices.

Kohls and Uhl (1980) states that the product differentiation in agricultural marketing has been neglected because effective branding is difficult. However, most agricultural
products including fresh fruits and vegetables, can be seen with brands on them. Thus branding is a competitive strategy that can be used by pumpkin exporters.

According to Kohls and Uhl (1980) one of the important aspects of product differentiation is that it acts as a weapon of competition in identifying that company. For example, an exporting company may introduce branding to its pumpkin exports which identifies the product as a premium quality item.

(b) Issues concerned with Marketing and the marketing management of the industry

As has been found during the inquiry, marketing and marketing management are amongst the main weaknesses in the operation of the export market. There is a need for exporters to understand the importance of using the marketing concept and market management functions in their marketing decisions. This will not only improve the efficiency in marketing operation but it will also improve the quality standard as the exporters will focus on the needs of the consumers. In addition, the bargaining power of exporters for a higher market share and price negotiations will also be stronger.

It should also be realised that the marketing concepts and marketing management functions cannot be effectively implemented unless there is a sound marketing organisation as
well as a full time marketing manager with sufficient marketing skills and experience in export marketing to plan and manage the marketing process.

The exporters should also be aware that the importers are not the ultimate consumer and should not end their responsibilities when the pumpkins are in the hand of the importers. They should realise the fact that the importers are the marketing agents for Tongan pumpkins and the responsibility to sell the pumpkins for greater profit depends upon the quality of pumpkins exported. Thus, the price will be decided by the demand and the demand will depend partly on the quality of the pumpkins.

(c) Issues concerned with the importance of the utilisation of the marketing mix in industry marketing.

I have discussed the importance of marketing concepts as well as the functions of marketing management in relation to the industry. This refers to the influence of marketing mix variables such as product (pumpkin); place, which refers to the distribution channels and transportation as well as marketing information; promotion, which refers to advertising and branding; and price, which refers to the price level, discounts and payment. It should be noted that this is not the exhaustive list of the market mix elements. However, I
will discuss some variables as an example of the importance of the marketing mix variables in decision making in the marketing process.

Marketing mix variables in the context of the pumpkin industry are the internal controllable variables which can be controlled by the exporters according to their marketing plan. However, the internal variables cannot function effectively without adjusting to the marketing environments such as the preferences of the consumers. It must be understood that both the internal variables and the external variables make up the business.

For example, the marketing information system for the industry draws data from the consumers or the importers as to customers' needs and desires. Before the exporting company can use this data, the external forces (external variables) of the marketing environment such as the political and economic situation of the market place, must be screened, to determine the present situation and potential impact upon the chosen plan of action. After that analysis, the exporter can consider the problem of how the company can respond and utilise its resources to achieve a balance between the internal and external restraints that define market opportunities.

Exporters can also utilise the marketing mix in the marketing plan, by considering every aspect of the company's purchase
of pumpkins, so that they meet importers' requirements and also fetch a price which will give satisfaction to the consumers as well as returning a profit to the exporters and their farmers.

The marketing mix consists of everything the exporting companies can do to influence the demand for the Tongan pumpkins. For example, the pumpkins must be produced with the perspective of satisfying the consumers' demand. The production of the physical characteristics of the pumpkins such as taste, sugar content and colour, must be directly influenced by the marketing information system which will be considered in marketing planning. Therefore market research is required to find out the characteristics of the market environment in order to make good marketing decisions in the application of the marketing mix (Tull et al. 1990).

(d) Issues concerned with the Quality of Pumpkins

Quality is one of the elements of production. It is the most important element for the long term success of the pumpkin industry. Quality involves the consistent delivery of the pumpkins according to the expected standards. The standard, or the actual form and content of the pumpkin provided, is central to any quality issue.

Because quality is the main concern of this export industry,
the quality standards and grades set by the importers must be supplied by the exporters to the farmers. Thus, the exporters have to ensure that during the production development their farmers and employees work to produce the quality standard expected by the importers. This can be done through well managed exporting companies which monitor the production process.

The erratic pumpkin quality in the past has mainly been due to the newly established companies, lack of quality standard and technological uncertainty. This erratic quality, even if caused by only a few exporting companies, can negatively affect the image and credibility of the entire pumpkin industry. For example, some exporting companies lack marketing facilities as well as marketing management skills and this contributes to the problem of low quality standards.

Successful exporting of quality pumpkins is the primary reason for an exporting company's existence. According to Poter (1980), a successful company indicates that profitability is the result of quality, conversely many businesses fail when quality is not a characteristic associated with their production development.

(e) Issues concerned with marketing information

One of the main weaknesses in the marketing of the industry has been the lack of marketing information. Marketing
information is vital for the people involved in the industry, particularly the growers and exporters. Receiving regular market information about the prices and quantity demanded will help the exporters to make good decisions regarding the operation of the production process of the industry.

Kohls and Uhl (1980, p. 331) describes marketing information as 'facilitating marketing function as well as essential to the efficiently operating marketing system.' For the exporters, the marketing information has to be up to-date and timely as it facilitates the production process and marketing decisions.

According to Kohls and Uhl, marketing information regulates the competitive marketing processes, and lubricates the marketingsystem. Kohls and Uhl (1990, p.452) further states that 'market news, information and research are the lifeblood of markets.' The market information presents the situation of market demand and supply, the price fluctuation and the market focus.

Schubert (1983, p.2) reports the important functions of agricultural marketing information are:

* creation of production stimuli by signalling market opportunities;
* stimulation of competition amongst suppliers as well as traders;
* promotion of the adaptation of supplies to the development of demand;
* in short term by means of spatial and temporal adjustment particular in transport and storage;
* in the long term by means of production development oriented towards the preference
structure of the consumers and towards comparative location advantages.

In marketing, 'knowledge is power' (Commonwealth-State Small Business Working Party and National Industry Extension Service, 1992). If the small businesses (such as the Pumpkin Exporting Companies) do not have knowledge about their markets, they are therefore either vulnerable to competition or are not fully able to exploit the potential of the markets.

Who is responsible for the collecting and disseminating of the marketing information? Where there has not been any marketing body responsible to forming a marketing information system especially in the developing countries, it then becomes the task of the government to provide marketing support services to assemble and disseminate the marketing information regarding the market situation and competition. In addition, the government should establish a special department to operate as a marketing information network to carry out market research.

(f) Issues concerned with the rejection rate of pumpkins in the marketing process.

The high rate of rejected pumpkins during grading and packing has been a great concern amongst the exporters and particularly to the growers. The Quarantine Quality and Management Division has estimated about 20 to 30 percent of marketable sized pumpkins rejected in the 1992 pumpkin season
Rejected pumpkins due to sunburn

Rejected pumpkins due to mechanical and physical defects
(Engleberger, 1993). This is a great loss to growers. The question is what can be done to reduce the high rate of rejected pumpkins? In addition, there is also the question of how can the rejected pumpkins be economically utilised?

According to my inquiry, the high rate of rejected pumpkins in the 1992 season was due to the enforcing of quality standard controls through strict grading and inspection of pumpkins to improve the quality standard. Because the growers did not manage the production process properly, many defective pumpkins were found. In addition, the poor handling of pumpkins by growers during the harvest and the supply of undersized pumpkins from poor pumpkin husbandry also contributed to the high rate of rejection.

This is one of the main issues of concern as it affects the quality standard as well as the returns to growers. The research team discussed this issue and suggested that growers should improve their field management practices to minimise the physical defects and that training farmers in better harvesting techniques would also improve quality. It should be realised that this task is an extra labour cost to growers. Thus a research program is required to address this issue so that the cost to the growers can be minimised, whilst at the same time, the quality standard of pumpkins can be improved.
The question of how Tonga can economically utilise the rejected pumpkins is an unresolved issue. Hence, there is a need for further investigation of the rejected pumpkins. Although, some growers and their relatives have utilised them for food consumption and livestock feed, particularly for the pigs, further study is necessary to investigate an export market opportunity in a processed or chilled form. The other alternative is, because of the high nutritional value of pumpkins (with low carbohydrate), that Tongans may be encouraged to consume pumpkins as one of their staple foods. This would provide Tongan society with a good healthy food as well as reducing the demand pressure on rootcrops.

(g) Issues concerned with Pumpkin Export Regulations

The appropriate role of government regulations in pumpkin industry is a highly controversial topic. Why is the public regulation of pumpkin industry necessary at all? Is regulation improving the pumpkin industry, or is the industry over-regulated? These are important marketing issues.

There has been a rapid growth in the scope of government market regulations which are focused on the food industry (Kohls and Uhl, 1980). According to Kohls and Uhl, the food industry is among the most highly regulated of all consumer product industries. Abbot (1987) points out that the development of a freely working marketing system can be assisted by government through regulatory action. Most
Governments also see some direct intervention to be in the public interest.

According to Kohls and Uhl (1980, p. 412),

those opposing regulations point to their inhibiting effects on innovation, efficacy and competition, as well as to the costs of regulations, which are borne either by food firms (in the form of lower profit) or by consumers (in the form of higher prices).

Those who are pro-regulations emphasise the need to "harness" private profit and seeking efforts to the public interest and to protect firms and consumers from anticompetitive market practices (Kohls and Uhl, 1980). An overall evaluation of food marketing regulations required consideration of both their costs and benefits.

Food marketing regulations attempt to regulate competition and monopolistic conditions, facilitate trade, protect consumers, directly influence food prices, and footer economic and social progress (Kohls and Uhl, 1980).

There are good reasons why the Government has to intervene and increase its role in the development of this export industry for the economic benefit of Tonga. The export of pumpkins has to be regulated as it is important to consumers, farmers, exporters and the society at large. The regulations which are formulated by the government aim to maintain the viability of the industry as well as police the fraud business activities particularly, amongst the exporters.
Kohls and Uhl (1990, p.455) has grouped agricultural marketing regulations into six classes:

1. Regulations to maintain competition and prevent monopoly;
2. Regulations to control monopoly conditions;
3. Regulations to facilitate trade and provide public services;
4. Regulations to protect consumers;
5. Regulations to directly affect food prices;
6. Regulations to foster economic and social program;

The intervention of the government in the pumpkin export market is an attempt to ensure that an orderly and dynamic economy acquires a set of rules that are devised and enforced by society through the instrument of government. However, most exporters believe, as Kohls and Uhl (1990) points out that too much regulation can restrain and stifle the profit seeking and independence of decision-making which is vital to a decentralised free enterprise system such as pumpkin industry.

The aim marketing of policy by the government is to seek a level of regulation which fosters an innovative, efficient, and progressive export marketing system that serve the whole industry rather than a particular group.

Government involvement in export marketing may be to restrict, permit or facilitate export marketing (Kohls and Uhl, 1990). For example, in the operation of the pumpkin industry, the government has restricted the allocation of market share to exporters through the Exporting Licence Act. This kind of act does restrict market freedom but in the
longer term it protects the niche market for the industry.

Government intervention through regulation can also be permissive. For example, the government has changed laws related to agricultural export commodities which were previously monopolised by the government Marketing Board so that they now permit the private exporting companies to involve in pumpkin export marketing.

Regarding the facilitative marketing regulations such as grades and standards, the regulations aim to facilitate the requirements of the consumers as well as to place the industry in a competitive position. For example, following the pumpkin crisis in 1991, the government introduced regulations to improve the grading and quality standard of pumpkin exports.

According to Kohls and Uhl (1990), decisions regarding regulations are usually not so simple as to regulate or not to regulate. Within the current export marketing situation, there is still a need to formulate regulations in order to protect the niche market of the industry from individual business interests. Often the freedom of one group must be limited in order to increase the freedom of others.

Regulations must subordinate the private interest in order to advance the public interest (Kohls and Uhl, 1990). There are difficult political choices made when regulations benefit one
Storage of the packed bins of pumpkins waiting for shipment

Arrival of the ship to load the pumpkins
group at the expense of another, resulting in unsatisfactory outcomes for either industry, consumers, or to the society as a whole.

In the future, agricultural export marketing regulations would change according to the progress of the economy as well as to changes in the market place. Some regulations which are considered vital at present, may no longer be useful in future export development.

New export markets and export development may bring about the need for new regulations. Although some regulations restrict freedom, others provide valuable services for farmers, exporting companies and the consumers.

(h) Issues concerned with the weak bargaining position of farmers in pricing decision.

The competitive structure of the pumpkin market is controlled by the exporters as the intermediary between the importers and the farmers. This leaves the pumpkin growers with no say or bargaining power in marketing prices for themselves.

Although the situation of pumpkin exports has improved since the government allowed private exporting companies to become involved in exporting pumpkins, the pumpkin farmers still have no independent representative in pricing decision making. This leaves the farmers greatly concerned about the
prices they receive in comparison to the profit made by the exporters.

Some export companies have been established without capital at all or investment in marketing facilities. They simply depend on the proceeds from pumpkin exports then decide what price should be paid to their farmers, leaving farmers in isolation and confusion about how the price is being calculated. This results in farmers moving from one exporter to the next in order to achieve the fairest price for their pumpkins.

From the farmers' viewpoint, the current marketing of the industry, which is controlled by the exporters, can be improved or reformed in order to allow the farmers to represent themselves in price decision making. Thus an alternative which could be considered is the formation of a Farmers Co-operative Marketing body to address the concerns of the pumpkin growers and to market the pumpkins. This farmers co-operative or association will give the farmers an opportunity to express their views and place farmers in a stronger position to bargain for a higher price. This move will also give more responsibility to farmers and help them to understand that they have to produce quality pumpkins for their own export marketing body.

A good example for this is the Friendly Island Marketing Co-operatives (FIMCO). FIMCO is a farmers' cooperative
marketing agent which exports produces. The farmer becomes a member when his produce is sold to FIMCO. FIMCO is very successful in the exporting of vanilla and vegetables and the profit it makes is paid back to farmers. Thus, if the pumpkin farmers cannot form an pumpkin cooperative to deal directly with the importers, they could join the FIMCO. The FIMCO could then export their pumpkins and the farmers will receive better prices as the profit is paid back to them.

The main constraint regarding this farmers' cooperative is the pumpkin exporting licence which is to be issued by the government. But the government should recognise the success of the exporting performance of FIMCO and that the benefit is all paid directly to the farmers. Not only does FIMCO have the expertise in international marketing, it also has sufficient marketing facilities and a well organised marketing organisation.

**Conclusion**

To conclude, this chapter focuses on the marketing of the industry. Because marketing skills are not sufficient in the operation of the industry, the author has raised some issues relating to the marketing and discusses marketing concepts and functions relevant to the problems found during the inquiry. These issues raised should be considered
in order to improve the export marketing of the pumpkin industry.

The next chapter will discuss the problems and concerns analysed by the research team. The problems concerned with the marketing process of the industry will also be outlined in the problems of the industry. Some improvements as well as the impact of the development of the industry will be also discussed. The research team raised some issues for further improvement of the industry, especially production development, which will be also discussed.
PLEASE NOTE

The greatest amount of care has been taken while scanning the following pages. The best possible results have been obtained.
CHAPTER 6

PROBLEMS IDENTIFIED, IMPROVEMENTS, IMPACT AND STRATEGIC ISSUES IN THE OPERATION OF THE INDUSTRY

Introduction

The prime aim of this research was focused on the exploration and analysis of the problems and concerns which have jeopardised the overall development of the Pumpkin industry and its export market. On the basis of an understanding of the operation of the industry and its market performance, this chapter will discuss the crucial problems and concerns identified during the action research.

The research team analysed the problems found during the inquiry and identified the crucial problems to address. During the process of the action research, the government at the same time intervened in the operation of the industry sharing the concerns of my research project because of the 1991 pumpkin crisis. The government, through the Ministry of Agriculture and Forestry, conducted a workshop for all parties involved in the industry (especially the exporters). The workshop aimed to discuss strategic plan to improve the problems occurred in the 1991 pumpkin season. The author was an observer during the workshop and all the research team members were present as decision makers for the development of the industry.

Some improvements made during the 1992 pumpkin season will
also be discussed. The improvements made were the outcomes a strategic plan endorsed by the exporters during the workshop. The strategic plan was used during the process of action research. As all the members of co-research team were involved in developing the strategic plan, the improvements made were partly an outcome of action research process and indicate the effectiveness of the collaborative inquiry which took place.

There have also been some strategic issues raised by the research team which concern the future improvement and operation of the industry.

**Problems Associated with the Industry's Development**

The critical problem throughout this inquiry, which greatly concerns the main parties involved in the development of the industry, is the 'Low Quality Standard' of pumpkin fruits exported to the Japanese market, in the 1991 pumpkin season. This is an important problem because quality produce is the most important factor in Japan's import industries. The Japanese are especially appreciative of unblemished fruits and vegetables as high quality production is part of the Japanese culture. Japanese consumers have a reputation for being very demanding about obtaining quality produce at a reasonable cost. They place emphasis on product appearance and packaging as well as superior function. To succeed in the Japanese market Tonga's pumpkin industry will need to establish its reputation by supplying high quality pumpkins.
on a consistent basis. This will secure and maintain the market share.

For this reason, the focus of the research team was on identifying the main causes of the low quality fruits as well as the associated problems related to the quality standard as far as the pumpkin industry's development is concerned.

The pumpkin industry is a fragile industry dealing with fresh perishable fruits which are exported to a complex market. Hence, the research team needed to look at the tasks of preparing the pumpkins, starting from the production process to the marketing. Whilst dealing with the problems of low quality, the inquiry explored the causes of low quality based on the questions of who was responsible, and what role that group played regarding the operation of the industry.

With reference to the problem of low quality fruits, it is obvious that the causes of low quality produce are related to problems amongst the growers, exporters, government departments and the bank. The causes of the low quality pumpkins and these associated problems of the industry have been classified in three groups:

a) problems associated with the role of the government in the industry;

b) problems associated with the production development and management;

c) problems associated with marketing and marketing management.
(a) Problems Associated with the Roles of Government in the Industry's Development

(i) Insufficient Policy and Regulations For Pumpkin Exports.

Although the establishment and development of the pumpkin industry was started by a farmers' association, it was found that the government had been slow in formulating a sound policy and export marketing regulations specifically to protect this niche market industry. As a result, the export companies and growers threatened this important niche market by supplying unacceptable, undergrade pumpkins.

(ii) Inefficient Administration of the issuance of the Export Licences.

It was also found that export licences issued to exporting companies were not properly administered according to the criteria formulated as guidelines in the issuing of licences. This also contributed to the oversupply of the market niche with low quality pumpkins as there were too many exporters competing in a limited market. The aim of the criteria is to control the market share as well as selecting competent exporting organisations which have already made contracts with reliable importers in Japan.


One problem which has become evident is that the government has overlooked the importance of establishing a marketing
department to disseminate market information and advise the marketers on the proper marketing skills for the industry.

(iv) Inadequate Funds Allocated to Develop the Industry.

Despite the Agricultural Export Diversification Fund, a fund setup by the government and administered by the Tonga Development Bank for the development of agricultural export industries, it was found that there were not sufficient funds allocated by the government to carry out the research programs required for the development of the industry. In addition, there were not sufficient funds to recruit more qualified quarantine inspectors and to improve the quarantine facilities.

(v) Deficient Government Infrastructure for Export Marketing.

Overall, infrastructure and facilities for export marketing are inadequate. In particular the storage sheds and machinery (eg. wharf forklifts) need upgrading.

(b) Problems Associated with the Development and Management of the Production Process.

The production process and its management are recognised by all parties involved in the operation of the industry, as the crucial problematic situation in the industry's development. This is because exporters have blamed the growers for the 1991 industry crisis. However, during the inquiry it was found that the exporting companies and the Ministry of Agriculture and Forestry had contributed to the 1991 industry
crisis as well as the growers.

The inquiry found that the field operations undertaken by the farmers were not performed properly. In addition, the exporters and the Ministry of Agriculture and Forestry did not effectively execute their tasks in the production process. These problematic situations were identified from two perspectives. Firstly, the problems associated with production development. Secondly, the problems associated with the management of the production process.

(i) Problems Associated with the Production Development.

Production development in this context refers to the activities involved with field operations such as land preparation, planting, fertilising, weeding, pests and disease control. This is vital as the initial stage of production process which has critical impact on the quality standard of pumpkin exports. It was found that some farmers had not carried out properly field operations such as land preparation and crop husbandry. The production problems were mainly due to the following:

(1) Lack of Skills of Smallholders in Farming Enterprise.

Because this is a new crop, and the cash returns are very attractive, it was found that farmers rushed into production without considering the long term implications. In particular, farmers did not consider the effect the cash crop would have on
land, labour and credit resources. This resulted in poor husbandry of pumpkin plots.

(2) Diseases of Pumpkin

It was found that a virus disease affecting the pumpkin crops was a problem threaten production development of the industry, as the virus disease can reduce the marketable yield per acre.

(3) Low Soil Fertility

One problem related to the production development has been the low soil fertility in various locations, especially at the eastern district of Tongatapu. This problem has been due to continuous cropping over three to four consecutive years. As a result, pumpkin crops were stunted and no marketable fruits were harvested. In addition, the recommended fertiliser application rate did not consider the variation in fertility across localities. Furthermore, some farmers did not adopt the recommended technology.

(4) Displacement of the traditional cropping system.

The nature of the monocropping system of the pumpkin industry has been a great concern to the
community. This is because many small holders have used their land for pumpkin monocropping displacing the traditional cropping system which can supply food crops as well as income. In addition, some farmers have felled or bulldozed coconut trees (the tree of life for the Tongans) to allow more open area for pumpkin growing.

Because of the attractiveness of the pumpkin industry, farmers, have tended to expand their area planted to pumpkins, causing land shortage for food crops and traditional cash crops, particularly on tax allotments less than eight acres.

(ii) Problems Associated with the Management of the Production Process.

Production management problems are problems associated with the management and coordination of the factors of production (land, labour and capital) and input supplies by the parties involved in the production process. This includes, farmers, exporters, researchers, extension officers and the suppliers of machinery services.

(1) Lack of Managerial Skills of Smallholders.

It was found that the field management practices undertaken by most farmers were not properly
planned and implemented. Field management practices refer to the land preparation, planting, weeding, pests and diseases control as well as fertiliser application. As a result, they did not efficiently utilise the production inputs resulting in poor quality and low yield.

Lack of farm management skills amongst the farmers was also a contributing factor to the problem of poor field management. Most farmers did not manage their resources properly, particularly credit funds, as a result they did not have sufficient inputs to apply while growing pumpkins. Some farmers lack skills in agricultural enterprise and do not understand that growing pumpkins is a business.

(2) Lack of Coordination in Providing Technological Information to Smallholders

One problem found during the inquiry was that the communication of information from research to the extension officers, and also from extension officers to growers, has not been effectively carried out. And in most cases the growers have misinterpreted the message delivered by the extension officers. This problem has been due to a lack of cooperation, communication break-
down or management failure of the research and extension administration.

(3) Insufficient Commitment by the Exporting Companies to their Farmers Groups.

Another production management problem, has been the failure of some of the export companies to take full responsibility for their growers, for example, by advising them of suitable field management practices, or ensuring that input supplies were in place prior to the beginning of the planting time. This problem has been due to the lack of organisational management and coordination among the exporting companies and their farmers groups.

(4) Insufficient Research Findings for the Pumpkin Growers.

Technology has been recognised as a component of the development of good quality pumpkin fruits. However, it was found that the current research findings have not been sufficient to address the problems regarding the soil nutrient deficiencies and diseases as well as post harvesting. This is due to the lack of planning and coordination in the research administration regarding the research programs required for the needs of small farmers.
(5) Poor Farming Practices.

It was found that the bush fallow period has been getting shorter due to continuous pumpkin cropping. At the same time there has been excessive utilisation of mechanised tillage, particularly the consecutive ploughing of the same land area for many years. This farming practice has degraded the structure of the soil. As a result the farmer has to spend more to buy fertilisers thus increasing costs. In extreme cases the land will not be capable of further cropping.

(C) Problems Associated with Marketing and Marketing Management

For the first time in the development of agricultural industries in Tonga, many private exporting companies are involved in the agricultural export marketing of pumpkins.

Traditionally the agricultural export marketing had been controlled or monopolised by the government's business arm known as the Tonga Commodities Board. The Board is a statutory marketing authority charged with exporting agricultural produce particularly copra and copra products, bananas, vegetables and vanilla.

(i) Problems Associated with Marketing
(1) Inefficient Marketing System

The traditional agricultural export marketing system relied on what the farmers could produce and sell to the marketing Board. This system allowed the farmers to pack their own produce with minimal supervision and inspection. The marketing system was decentralised and the farmers had a great deal of independence as far as grading and packing was concerned. As a result the farmers always practiced poor quality control. The classic example of the failure of this system was manifested by the banning of Tongan watermelons and bananas by the New Zealand Authorities due to the poor quality control during grading and packing (World Bank, 1990).

(2) Inefficient System for Quality Control.

The decentralised marketing system, which has continued to be utilised by the exporting companies, is not sufficient to ensure that the quality standard is maintained. This system is not convenient and time consuming for the operation of the QQMD as it has insufficient resources to implement the quality control, as a result the farmers pack low quality as well as defective fruits.

(3) Insufficient Marketing Skills of the Exporters
It was also found that a problem which contributes to the low quality standard is the misunderstanding of exporting companies and farmers of the concept of selling and marketing. Marketing is selling what the consumers want. Instead, the farmers and exporters expected the consumers to buy whatever they have produced. A selling concept focuses on the need of the seller or marketeer rather than the consumers.

(4) Exporters are Price Takers

Another cause of low quality fruits is that exporters are price takers rather than price makers. This means that exporters tend to accept any price offered without considering a strategy to improve quality so that they have a stronger position in price negotiations. The classic example of this practice was evident in the industry crisis in the 1991 season. The exporters sold whatever they had produced for whatever price was given. As a result the exporters exported almost double the actual market share of the 1991 season, flooding the market with low quality and undergrade fruits.

(5) Poor Postharvest Handling

The postharvest handling of the pumpkins by farmers was also found to be one of the causes of low quality fruits. The post harvest marketing chain includes the
handling of fruits in the field by the farmers during harvesting, and the transporting of pumpkins to the packing house. In many cases growers handle fruits roughly and carelessly, resulting in bruising and causing the fruits to decay. This was not noticed by the inspectors until the consignments were unloaded in Japan. As a result, the importers spent much time repacking, incurring extra costs which reduced the prices to the exporters as well as the farmers.

(ii) Problems Associated with Marketing Management.

Marketing management refers in this context to the analysis, planning, implementation and control of programs designed to create, build and maintain beneficial exchanges with the importers for the purpose of achieving exporters' objectives. In other words, marketing management is the management of the marketing process, including grading packing, transport, storage and shipping until the produces have been bought by the consumer (Abbot, 1987). Marketing management has proven to be one of the weaknesses in the marketing of the pumpkin industry.

(1) Insufficient Marketing Management Skills.

The fundamental problem is the insufficient knowledge by exporters of the principles of marketing and marketing management. This shortcoming has created the
mismanagement of the marketing activities of the niche market. It was found that these marketing functions were not seriously considered by some exporters. As a result the exporters competed amongst themselves for this limited market.

(2) Poor Marketing Organisation

Formal marketing organisation was found to be lacking in most of the exporting companies. Since the inception of the pumpkin industry, most exporters have not formally established themselves as sound exporting companies managed by a full time marketing manager. Instead the export companies have just operated during the pumpkin season without a qualified manager and insufficient marketing skills. This lack of management expertise has created real problems for the industry.

(3) Lack of Coordination and cooperation amongst Exporters

It was found that the exporters are not coordinating the implementation of the marketing process (such as quality control and shipping arrangement). The exporters tend to emphasise open competition without cooperation with the government to develop the niche market.
Action for Improvement Made in 1992 Pumpkin Season

(a) Export Licence and Allocation of Market Share

The Government has limited the issuance of export licenses to only seven exporters out of twenty two applicants. The total market share for 1992 was restricted to 10,000 tonnes by the government, which is a reduction of about 10,000 tonnes or 50 percent from what the exporters had exported in the 1991 pumpkin season. The allocation of the market share of the exporting companies is based on performance from the previous years as well as the number of farmers that have been registered in that exporting company. The availability of marketing facilities and evidence of a market share already negotiated with a Japanese importer(s) is also taken into consideration in allocating an individual exporter's market share. Although there was some dissatisfaction expressed by the exporters, the government has managed to control the total market share exported in the 1992 pumpkin season.

(b) Quarantine and Quality Management

One of the most important improvements made by the government has been the formulation and approval of the Pumpkin Standard Grade Regulations under the Fruits Export Act for pumpkin exports in Tonga. The Regulations operated during the 1992 pumpkin export season.

Prior to the approval of the Standard Grade Regulations, a workshop was conducted by the Ministry of Agriculture and
Forestry. The workshop aimed at the importance of bringing together the exporters to discuss issues concerning the regulations in order to reach an agreement to implement the regulations.

Decision making for the quarantine and quality management is made much easier by having these regulations in place. In addition, the regulations allow the Quarantine Quality Management Division to exercise greater power as far as the quality of pumpkins is concerned.

The government banned the export of undersized pumpkins and centralising the grading and packing, to improve the quality standard. Through the enforcement of the Quality Standard Regulations and the centralising of the grading and packing under the exporters' responsibility, the quality standard has improved substantially. The system of central packing by exporters has proved more successful as with the introduction of the conveyor belt machine, a 100 percent inspection of pumpkins is assured. In addition, the growers are no longer involved in packing their pumpkins.

Due to the effectiveness of the grading and inspection done in 1992 season, the QQMD estimated that the pumpkins rejected amounted to about 40 percent of total farmer's production (Englberger, 1993). Whilst this is a great loss to individual growers, it has greatly improved the quality standard of the pumpkin exports, and should lead to better returns to growers in the long term.
The government has also allocated funds to the QQMD to recruit more quarantine staff and improve its facilities. It is important to note that the government has responded positively to the concerns regarding the need to enforce and improve the vital services provided by the QQMD for pumpkin exports.

(c) Performance of Exporting Companies

Regarding the performance of the exporting companies, there have been some improvements, particularly in the introduction of a new marketing system by some companies as well as the application of the quality standard regulations. Co-operation between the government and the exporting companies has also improved.

Because the exporters' market share has been limited, it was found that they have focused on improving their marketing facilities in order to improve the grading and the inspection of pumpkins. In addition, some exporters had also paid greater attention to the field operations of their growers to ensure the quality standards were maintained.

Regarding the allocation of acreage to individual growers, the exporting companies have recognised the importance of improving the productivity and quality through allocating fewer acres per grower (across many growers) rather than allocating many acres to a few growers. This has provided opportunities for more farmers to participate in this export market. As a result, according to my inquiry, 90 percent of
about 1000 pumpkins growers in 1992 planted 2-4 acres while only 10 percent planted more than 5 acres of pumpkins. This is important as the experience in the previous pumpkin seasons was that only the growers who planted less than 4 acres had produced reasonably high yields. This is apparent because those who planted large acres of pumpkins commonly used hired labourers who were not properly trained in the application of technology. In comparison, a farmer with small acres of pumpkins, usually works by himself or utilises his family to manage the pumpkins.

(d) The Improvements in Production Process

The operation of the production process has improved. This has been due to the limiting of the exporters' market share as well as the restricting of the allocation of acreage to individual growers. Because of these limitations, the exporting companies, the Ministry of Agriculture and Forestry and the growers have coordinated and carried out the production operations more efficiently and effectively. These improvements have resulted in better quality of land preparation and this has been completed in time for planting.

(e) Training

Training programs for farmers have been regularly conducted. Although there have been some improvements made, there is still a need for further evaluation of the effect of the training programs on the farmers' yields. Apart from training, leaflets have been distributed to farmers and radio
programs regarding field management practices have also been broadcast. Training of extension officers has also been conducted.

The impact of the Development of the Industry

(a) Impact on the Socio-cultural Environment

While the industry is still in its establishment stage, its development has started to affect the economic, social and the ecological environments of Tongan society. During the inquiry, observations and personal communications revealed that the development of the industry has become the first agricultural enterprise with much influence on the social and economic activities of Tongan society, both in urban and the rural communities.

This has been manifested by the great number of households involved in growing pumpkins. Not only individual households, but their relatives are also involved as hired labour. Family labour includes women who otherwise are rarely involved in any economic activity. The industry breaks a barrier in the traditional division of labour in Tongan society as the men are responsible for agriculture and women are responsible for household activities, especially for cooking and childcare. It was observed that the whole family including children are involved in the production process including harvesting. Employment opportunities have been also increased through permanent or casual hired labour.
(b) Impact on the Economic Development

Regarding the impact on economic development, it was observed that the standard of living in the villages has improved. Better housing and an increase in private vehicle ownership among pumpkin growers are visible systems of the change. In addition, more pumpkin growers have been able to afford expensive farm machinery such as tractors and boom sprayers. Although no statistics were collected on the effect of consumer goods purchased, it has been observed that the buying power of pumpkin households has increased substantially in comparison to non-pumpkin growers.

Informal interviews show that most of the pumpkin growers spent most their income from the pumpkins on education, home improvements and vehicles, donations to churches and food.

While the economic benefit of the industry have been recognised in Tongan society in general and by pumpkin growers in particular, there is a concern regarding the impact of a monocropping system introduced by the industry development. The concern is focused on its effect on the shortage of food supply in the domestic market. A seasonal shortage has occurred due to the development of pumpkin industry. Although there has not been any specific study to assess the food crop situation during the pumpkin season, the impact of high prices of root crops at the local market in comparison to the off season pumpkin, has been noted.
During the operation of the pumpkin season, the pumpkin growers have generally concentrated on pumpkin growing without planting foodcrops. As a result, after the pumpkin season, the rootcrops supply in the domestic market has declined markedly with an increase in price. The shortage of foodcrops is not a problem of land availability, but rather a lack of planning by farmers in coordinating their planting time table. My inquiry, farmers just realised they should have planted their foodcrops earlier during the year prior to the pumpkin season on the second half of the year.

Another impact of the developing industry is that the enterprise orientation of growing pumpkin acts as a catalyst for the economic activities of small holders and also accelerates the transformation process from subsistence farming orientation to a commercial farming orientation.

The shortage of the rootcrop supply at the domestic markets with increases in price, is an advantage to the farmers who are concentrated on rootcrop farming. These farmers have high returns for their rootcrops during this season. However, if farmers choose to increase their income through neglecting food production there will be an overall shortage in the food supply. This will encourage people to depend on food imports such as rice and flour which will contribute to a widening of the deficit import bills and will result in slower economic growth.
Regarding the possibility of displacing the mixed cropping system with the monocropping system, it was observed that there was a recognised effect on pumpkin growers who have less land. This is because these growers utilise all their lands in growing pumpkins without land for planting foodcrops. As a result, these growers are heavily dependent on the domestic foodcrops supply as well as imported foods.

(C) Impact on the Physical Environment

During the inquiry, it was observed that some pumpkin plots have been stunted and the farmers could not obtain any economic benefit. This is a symptom of low soil fertility due to the poor soil structure, a result of the pumpkin growers practice of monocropping with continuous ploughing of the land in consecutive years without applying crop rotation or bush fallow. As a result, soil degradation problems have occurred.

Although no study has been undertaken, there is concern about possible pollution to the underground water due to the heavy applications of chemicals in pest and disease control and fertilisers' applications. The underground water is the main source of water supply for rural and urban communities. Further study is required to determine the extent of this effect.
Strategic Issues for Discussion

(a) Issues Concerned with the Strategic plan

In order for the industry to be more competitive, it is crucial for the decision makers to formulate a strategic plan for the further development of the niche market in Japan.

Goldworthy (1989) defined a strategic plan as a well defined course of action. According to Goldworthy it is a plan of action towards a specified goal. Regarding the industry development there must be a goal and the decision makers have to formulate a strategic plan to achieve their goals. Porter (1980) describes a strategic plan as the combination of goals for which the company is striving and the means by which it is seeking to get there.

A strategic plan in the context of the industry is a guideline for action in which the government and the exporting companies focus on what should be done to improve the development of the industry as a whole towards its export market.

This is crucial as there are not many opportunities for Tongan agricultural products in the export markets. Thus the strategic plan should place more emphasis on what should be done to develop the niche market profitably in the longer term for the benefit of the Tonga in general and for the people involved in the industry in particular.
Goldsworthy (1989) describes the strategic plan as outward looking, towards the needs of the customers. According to Porter (1980), the formulation of a strategic plan should be in a competitive environment. Porter (1980) suggests an approach to the formulation of a competitive strategy (Table 35).

By analysing the problems explored during the inquiry, it is clear that the exporting companies and the government did not formulate clear goals and strategies for the development of the industry apart from the intervention of Government in the 1992 pumpkin season. The industry was started by a Growers' Association without much thought about the development of the niche market in Japan as the only market of the industry.

Up until recently, the focus has been on the quantity of pumpkins produced. In addition, the exporting companies involved have operated independently by focusing on individual interests rather than on the overall importance of the industry.

In this regard, the research team agreed to work based on goals and the strategic plan which was introduced during the operation of the industry in the 1992 pumpkin season.
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<td>Given an analysis of industry and competitors, what are the company's and weaknesses relative to present and future competitors?</td>
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The goal is to produce quality standard pumpkins to meet with the requirements of the niche market. The strategic plans are: 1) to limit the total market share in 1992 pumpkin season to 10,000 tons; 2) to limit the number of exporting companies exporting pumpkins in 1992; 3) to enforce the quality standard control through the formulation of regulations.

The strategic plan was implemented and the situation has improved as has been mentioned above. However, there are some issues still to be addressed. These issues require all the parties involved in the industry to further discuss and review the strategy so as to address the issues still unresolved. The research team discussed some issues they thought relevant for further improvement of the development of the industry. These issues are concerned with the overall administration of the industry as well as the production development issues.

(b) Issues Concerned the Overall Administration of the Industry

There has been concern amongst the main parties involved in the operation of the industry regarding the reluctance of some exporters to discuss and formulate a common goal and national strategy for the development of the industry particularly with regard to its niche market.

In this regard it might be useful for the government and the exporting companies as well as farmers' groups to consider
the formation of a national administrative body to manage and control the development of the industry. This administrative body should be in a form of a national council, electing the representatives from exporting companies, government, bank and the farmers' groups. This can be called a National Pumpkin Council and it should become a body independent of the government.

The responsibility of the Pumpkin Council should focus on formulating national goals and strategies to keep the industry more competitive and make sure the farmers get higher prices. It was observed during the inquiry that the farmers do not have much bargaining power in price negotiation with the exporting companies. This is due to the fact that the farmers are under the control of the exporters. In the formation of a Pumpkin Council, the concerns of farmers may be addressed without being influenced by the exporters.

This type of council as discussed by the research team, has proved successful in the pumpkin industry of New Zealand particularly with respect to its market development and marketing (Holo, pers. comm. 1992). One of the tasks of a council is to conduct market research and establish marketing information system to inform the exporting companies regarding the market opportunities.

Because the Japanese import market is complex, there is a need for a well coordinated authority (such as the New Zealand Pumpkin Council) to do market planning as well as
marketing research. Marketing research information is crucially important as the exporters and farmers must be informed about the situation of the niche market in terms of demand trends as well as prices. In addition, the opportunities for further expansion or threats from the potential competitors can be known, which facilitates the planning of exporting companies. This source of information will become a network for the further development of the industry.

(c) Issues Concerned with the Involvement of the Exporters in the Farmers' Production Process

It was observed during the inquiry that some exporting companies did not make an attempt to monitor their farmers' field management practices. There has been a concern amongst farmers that the exporting companies should contribute more than the arrangement of the production input supplies such as seeds, chemicals and fertilisers for farmers.

According to discussions with some farmers and government officials as well as some of the exporters there was a view that the exporting companies should offer better support services such as training and regular monitoring of farmers' practices. This is very important because the farmers' groups are the suppliers of the market share of the exporting companies. If the exporting company does not coordinate and respond to the farmers' requirements to improve their farming operation, the company may not be able to supply its market share.
McGregor et al. (1992) point out there is a need for intensive management and extension for high value short term crops such as pumpkin. This will be more effective and efficient if the export companies operate their own extension and monitoring services as well as supplying production inputs such as seeds, fertilisers and chemicals as has been currently operated by the Primary Produce Company Limited (PPCL).

According to McGregor et al. (1992), this management approach has been successful in the Fiji Sugar Industry as well as the Hawaiian Papaya industry which deals with smallholder farmers. The Hawaiian papaya industry has been involved with 300 smallholder farmers where each farmer has a 4.8 acre papaya plot. The company deals with production development, marketing, market, constraints as well as technology transfer.

Because of the involvement of members of the exporting companies in the growing of pumpkins, they can become producer-based organisations which can be structured into a commercial vehicle to promote sustained industry development. Their activities can become more like those of the Hawaiian papaya industry. The exporting companies also even provide short term credit to their farmers' groups.

The exporters needs to be realise that the nature of the market for perishable crops like squash is fragile, but the government extension services tend to be too diffuse for an
intensive short-term crop such as pumpkin where timing is crucial. With proper coordination, the exporting companies do not have to depend on the government extension services. The exporters also need to realise that the production costs for growing pumpkin are very high and there is a need to find ways to help farmers to reduce their costs.

Regarding the testing of introduced technology, the exporting companies may consider a funding of some research programs specifically designed for increasing the productivity of their respective growers. This move will shift the dependent on-station research findings to an on-farm research which will more appropriate to the grower's needs and condition as the research will be carried out in the grower's tax allotment.

Funding of research programs has been a problem in the research division. The exporting companies can help through funding some pumpkin research programs. This can be done through an export levy on exporting companies as well as farmers in order to collect funds to finance the research programs specifically required by the exporters and the farmers. By doing this the exporting company will be able to effectively and efficiently control the production process as well as marketing.

(d) Issues Concerning the Farm Management Skills of Smallholder Pumpkin Growers

More than 90 percent of pumpkin growers are smallholders with
experience only in traditional low input farming. During the inquiry it was observed that the field management of pumpkin plots is the main weakness facing most growers. There are two reasons for this. The first is the inability of farmer to adopt the technology recommended by the extension officers. This is due to the lack of understanding by farmers of the high inputs needed by commercial crops such as pumpkin. The second reason is the lack of communication and inability of the extension officers to effectively approach farmers. There is still a need for the extension officers to be trained not only in agricultural technology, but also to improve their extension practices and commitment.

In terms of entrepreneurial and management experience the smallholder farmers still have insufficient skills and understanding to make the transition to modern commercial export oriented agriculture. A study done by the Asian Development Bank (MaGregor et al. 1992, p.6.) in Fiji on smallholder farmers concluded:

The lack of expertise in farm management is a widespread and serious constraint to increasing productivity and is often underestimated in agricultural planning. Farmers operate under inefficient and low productivity management systems; they have little experience of practical farm planning and elementary financial forecasting, or the methods of controlling or integrating all the farms' resources into a package of practices directed toward the profit objectives.

McGregor and Eaton (cited by McGregor et al. 1992) state that the lack of farm management skills amongst smallholder farmers is typical of Pacific islands agriculture. Farm management skills refer to the skill of the farmer
in planning as well as managing the operation of a farm enterprise. The conclusion of the study calls for a smallholder management and extension service, which would assist the smallholder farmers in the pumpkin industry to successfully participate in new high value crop development.

It should be recognised that the pumpkin industry is the first commercial cash crop for Tongan farmers, who in the past relied on traditional rootcrops to market as well as food consumption. Therefore, pumpkin growing is a relatively new farming activity for most farmers and cash crop growing is a new experience, so the farmers are in a transitional stage of shifting from traditional farming practices to the new technology and farm business management.

Extension services sometimes target the wrong farmers. There is a need for the administration of extension services to focus their attention on the training and educating of disadvantaged farmers rather than key farmers who have already adopted the technology. It has been observed that some extension officers assume that the farmers are informed about the technology without evaluating the farmers' output.

The Tonga pumpkin industry should consider the approach taken by some agricultural export industries in other countries, dealing with smallholder farmers. McGregor and Eaton (cited by MaGregor et al. 1992) report the success of Hawaii's papaya industry and Fiji's tobacco industry which are both involved with smallholder farmers. Their success was due to
the effective management approach carried out by the involvement of commercial agricultural industries. The study indicated that the approach could be adopted and adapted to the development of a commercial smallholder based agricultural export industry in the Pacific.

According to McGregor and Eaton (1992, p.12) these two industries have established their own units responsible for all activities involved with the smallholder farmers. These are:

- The supply of planting material to contracted farmers.
- Provision of mechanical services for cultivation spraying.
- Regulatory control of grower performance.
- Technical advice and irrigation technology.
- The sole marketing channel for contracted production.

During field operations, according to McGregor and Eaton, the smallholder farmers are asked to participate on the basis of the following.

- Past farming record
- Availability and suitability of land
- Agreement to follow the defined package of practices
- Agreement with the financing and cost recovery procedures
- Guarantee to deliver the produce exclusively through the nucleus unit (1992, p. 12).

This approach was undertaken by the private sector without relying on government research and extension services. The study further reported that the commercial management company, after gaining the farmers' confidence, can transfer new agronomic ideas and innovative techniques to often wary farmers more rapidly than the government support services.

There are three important components of this inter-
relationship reported by McGregor and Eaton (1992, p.13.):

1) provision for planning, research, and managerial inputs required for the cultivation, harvesting and marketing of the commodity;
2) the manner in which field extension services are applied;
3) the level of technical diffusion and material and financial support needed for viable sustained production.

It should be noted that the development of the pumpkin industry by the private exporting companies is similar to the above industries' development. However, in the pumpkin industry the exporting companies are still dependent on government support services, particularly the research and extension services. As those government services are not effectively and efficiently delivered, it is about time the exporting companies adopted this approach so they can control and monitor the whole operation of the industry, and in particular so that smallholder farmers can become more confident in their commercial farming and make better returns for themselves by producing top quality pumpkins for export.

It should be noted that the success of the government policy still depends upon decisions made by farmers at the farm level (Upton, 1987). It is therefore important that decision makers concerned with promoting the pumpkin industry should understand farm level decision making, the problems faced and the ways in which choices are made by individual farmers. This would enable the exporters, researchers and extension officers to listen and appreciate the needs of smallholder farmers.
According to Kay (1986), in an agricultural enterprise which is involved with high input costs, which uses many technological innovations and operates with large amounts of borrowed capital, management is a problem-solving and decision-making activity. This is vital from the farmers viewpoint as many farm management problems of pumpkin growing fall into these questions: How much to produce? how to produce? and what to produce? Essentially, the production decisions of pumpkin growers should be based on these three management questions in order to supply the market share as well as produce high quality pumpkins.

(e) Issues Concerned with Land availability

Land scarcity is becoming an important issue as far as agricultural development is concerned and this is a factor which is potentially important to the further development of commercial crops such as pumpkins.

Despite the short production cycle (3 months) of the pumpkin, there has been some concern regarding the land occupied by the pumpkin plots during the pumpkin season. This is because it has been perceived by most people, particularly the decision makers, that growing pumpkins has occupied most of the smallholders' tax allotments, with less land or no land at all for growing food crops.

However, according to my survey of 100 pumpkin growers, 85 percent of the growers had no problem with land shortage for further agricultural development. This is due to the fact
that these farmers have more than one tax allotment. These tax allotments are received from two sources, either through leased land or land borrowed from the growers' relatives. Leased land is the nobles' estates, government land or private tax allotments which are leased by farmers. Borrowed land refers to the land borrowed by some farmers from their relatives or friends who have land but they do not cultivate it, or from those who migrate overseas. This is a 'Tongan way' in dealing with undeveloped land which is commonly practiced within the extended family.

The other 15 percent of the growers had a land shortage. This is because these farmers have only one tax allotment, rather than because they planted almost all their tax allotment with pumpkins. This finding reflects the fact that the current situation of land availability is not a major problem.

A cropping survey done by the Ministry of Agriculture and Forestry (MAF, 1992a) revealed that during the surveyed period of 4 months, only 30 percent of the Kingdom's total agricultural land was managed, of which 11 percent was cropped. Again this finding indicates that land availability is not a problem.

In spite of the fact that current land availability is not a constraint, the government and the exporters should realise that land shortage for agricultural development will be a potential problem if the current growth trend of the pumpkin industry continues. Thus the controlling of the total market share and acres allocated to pumpkin growers should
incorporate a strategy to alleviate the problem of land availability.

(f) Issues Concerned with Increasing Productivity

Productivity has been an issue neglected by most people involved in the development of the industry. However, the research team thought that this is an important issue as it basically depends on some other factors such as technology, and field management practices, as well as the agrosystem in which the pumpkins are grown. In this context, productivity refers to the maximum marketable yield which can be produced per unit area of land (tonnes per acre) by the farmers.

Given what has been mentioned above regarding the concerns about the land shortage for further agricultural development, decision makers should consider a strategy for increasing productivity of smallholder farmers per unit area rather than extending the size of pumpkin plots in an attempt to increase production.

It was found during the inquiry that the average marketable yield produced by the farmers was 3 tons per acre. This is very low in comparison to the average yield produced by the Japanese pumpkin growers, who produce about 10 tons per acre of pumpkin crops (Manu, 1990a). According to Manu the yield produced in Japan can be produced in Tonga if the technology is properly applied with better management.

Increased productivity relies on the cooperation of researchers, extension services, exporting companies and the
growers in a production strategy in which available resources and improved technology can be utilised effectively and efficiently. Knowing the current yield per unit area is low, there should be more research programs towards increasing productivity. At the same time there needs to be some training of farmers to efficiently utilise their resources and, hence, to increase productivity.

In addition, the allocation of acreage to growers would be controlled as it has been found that the growers who have planted less than 4 acres produced the highest marketable yield per acre as they properly managed their small plots. In contrast to this, lower yields were achieved by growers who planted more than 4 acres with poor management.

Productivity has to be maintained in the longer term in order to consistently supply the niche market. This can only be done through a formulation of a long term strategy focusing on smallholder farmers. For example, the incidence of virus disease can potentially reduce the productivity especially if there is no strategy to combat this threatening problem. On the other hand increasing productivity through the heavy application of agro-chemicals will cause an environmental problem. Thus sustainable agriculture cannot be maintained. There is a need for further research in this area to find an appropriate approach to increase productivity with minimum effects on the agro-ecosystem.
(g) Issues Concerned with the Profitability of the Industry to Growers

The industry was not very attractive at its inception in 1987. This was due to the low price received by farmers as well as the fact that the crop was still new to many farmers. Due to the high operation costs of the industry, particularly marketing, farmers had very low returns despite the subsidy given by the government. In addition, the marketable yield produced by the farmers was relatively low.

By the 1990 pumpkin season, the operation was very successful as the prices were reasonably high and some marketing costs were reduced. The industry earned net foreign exchange of over T$2.5 million. About T$2 million was distributed to the growers (TDB, 1990). Furthermore, the financial gain in 1991 season was even better. It gave Tonga net foreign earnings of T$7 million.

Despite the benefit received from the foreign earnings in the industry, there have been concerns with the returns received by the farmers for their family labours in the production process. However, according to the farmers' response during my inquiry, pumpkin is the most profitable agricultural cash crop they have ever grown. This may be true because the farmers receive a lumpsum of payment once in the pumpkin season. In addition, it takes only a few months to get a high income. But according to the economic analysis of one acre of pumpkins (Table 36), the return after labour is very low (T$ 346 per acre), in comparisons with the gross margin of
cassava (T$1199). However, it should be noted that the crop duration of cassava is 14-18 months with low production and low labour inputs while the pumpkin is only 90 days with high production and high labour inputs. Farmers appear not to have fully realised that other cash crops (such as rootcrops and vanilla) are also profitable and may be even better than pumpkins in terms of low input costs with high returns. In focusing on pumpkins they have tended to forget about other possibilities.

<table>
<thead>
<tr>
<th>Table 36: ECONOMIC ANALYSIS OF ONE ACRE PUMPKIN.</th>
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</thead>
<tbody>
<tr>
<td><strong>INCOME:</strong></td>
</tr>
<tr>
<td>Average Marketable Yield per Acre: 3 tonnes</td>
</tr>
<tr>
<td>Price: T$500 per ton</td>
</tr>
<tr>
<td><strong>A: Total Income</strong></td>
</tr>
<tr>
<td>$1,500.00</td>
</tr>
<tr>
<td><strong>VARIABLE COSTS:</strong></td>
</tr>
<tr>
<td>Land preparation</td>
</tr>
<tr>
<td>Seeds</td>
</tr>
<tr>
<td>Fertiliser</td>
</tr>
<tr>
<td>Chemicals</td>
</tr>
<tr>
<td>Transport</td>
</tr>
<tr>
<td>Miscellaneous</td>
</tr>
<tr>
<td>Labour</td>
</tr>
<tr>
<td><strong>B. Total Variable Costs</strong></td>
</tr>
<tr>
<td>1,154.00</td>
</tr>
<tr>
<td><strong>C. Gross Margin after Labour (A-B)</strong></td>
</tr>
<tr>
<td>346.00</td>
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The economic analysis includes includes all labour costs. However, most growers utilise family labour which they do not value as a cost of production. Thus the returns per acre of pumpkin are not as low from the farmers' viewpoint, as the low returns indicated by the analysis. In addition, because
of the short production cycle of pumpkins, the growers tend to assume that the pumpkin is much more profitable than the other crops such as rootcrops and vanilla. This economic analysis is required to make the farmers aware of that so the family labour can be valued as a cost and the farmers can be made aware of the real returns received from their investment.

The high input cost of growing pumpkin, particularly the cost of seeds, fertilisers and chemicals, has been a concern to growers as it greatly affects the growers' returns. Without further research and education of the exporters and growers to increase productivity and reduce costs through effectively and efficiently utilising resources, the profitability of the industry in future will be in question.

(h) Issues Concerned with the Research

Agricultural research faces important challenges to provide technology to benefit the growers (Ostern et al, 1989). Most of the research in Tonga has been undertaken to provide technology to increase productivity of introduced cash crops. However, regarding the pumpkin industry, there is a need for the administration to set the priority research programs to meet with the immediate needs of the growers.

Research findings of the present research programs, (the results of the on-research station trials) may not be applicable to the growers' farming conditions as the recommendations are too general. In order to effectively
utilise the research findings the research programs should be carried out at some of the farmers' tax allotments replicating actual production conditions. Farmers can then participate in the research process and the implementation of the experiments.

Without introducing this type of research, the farmers will be reluctant to adopt the research findings recommended from on-station trials. If on-farm research takes place, the farmers will become involved in technology transfer development independently of the extension officers. This farming systems research will enable the researchers and extension officers to focus on the needs of small farmers.

Osten et al (1989) point out that few research institutions have focused on the needs of the small holder farmers. According to Osten this failure stems from institutional constraints. Small farmers have not had a voice and means to express their demands for technology within the research programs, and as a result, their needs have not been effectively addressed.

Although on-farm research programs will face problems of organisation and management, the researchers are required to appreciate the farmers' situation. Osten et al (1989) state that the farming system research approach should emphasise adaptive research through on-farm, farm-managed experiments in order to give adequate weight to growers' goals and management strategies.
In on-farm research both technical and socio-economic factors can then be taken into account and the experiments serve to bridge the gap between research and extension (Osten, 1989).

Kesseba et al (1989, p.39) point out that

...the research by individuals or even by large teams, however strongly motivated, will not be sufficient if these specialists are forced to work in relative isolation. An exchange of knowledge and ideas must be actively encouraged at all levels.

Rhoades (1984), in his model for generating agricultural technology known as the "approach, stated that

...the basic philosophy upon which the "farmer" model rests is that interdisciplinary research must be done within the farmer, farmer household, and p.33).

According to Rhoades, the emphasis should be putting the researchers in the farmers' situation so that they understand how they view the problem in both technical and socio-cultural terms. Thus

...research must come full circle from proper problem identification, to farmer acceptance or rejection and problem orientation. Furthermore, research, extension, and transfer should be viewed as parallel and ongoing, not sequential, activities (Rhoades, 1984, 33).

The involvement of farmers and exporters in research programs for the development of new technologies, particularly the production development and harvesting should be encouraged as a motivation for adopting new technology to improve productivity.
(i) Issues Concerned with the Allocation of Economic Opportunities in the Industry

There has been debate within the Tongan community about the allocation or distribution of economic opportunities in the pumpkin industry. Economic opportunity refers to the allocation or distribution of export licences as well as the allocation of acreage amongst farming and non farming communities.

The pumpkin industry has recently been regarded as the most profitable agricultural export industry. This perception has attracted a wide range of people from both farming and non farming communities, regardless of whether he or she a wealthy, powerful, well educated, noble, high salary earner, prestigious or poor.

The "pumpkin rush" has been a great concern to the farming community, particularly to the low income smallholder farmers who make up the majority of Tongan society. Although the majority of pumpkin growers are categorised as smallholder farmers, there are still many full time farmers who have no opportunity to participate, as many salaried earners as well as relatively wealthy people have been allocated with large numbers of acres (more than 8 acres) to grow pumpkins. These large allocations of acres could be allocated in small quotas (2 acres) to full time farmers. It has been observed that some wealthy, powerful, high salary and prestigious people have been allocated with larger acreages to grow pumpkins compared with the majority of full
time smallholder farmers who seek an opportunity.

The pattern of allocation (or distribution of the opportunities) in the pumpkin industry demonstrates the fact that the allocation of economic opportunities is still dominated by the hierarchical social structure.

Conclusion

The research team has discussed the critical problems which affect the development of production as well as the niche market of the industry, particularly the management and development of the production process and these discussions are the basis of this chapter. Through the collaborative discussions of the research team, some issues have been raised for further investigation.

Although the government and other parties involved have begun to address some crucial problems especially the quality standard control, there are some strategic issues which must be addressed if the Tongan pumpkin industry is to secure its market.
CHAPTER 7.

CONCLUSION

Introduction
My research project has emphasised two main aspects in the development of the Pumpkin Industry. First is the development of the production process which focuses on how the main parties involved in the production process can produce quality pumpkins which are required by the Japan pumpkin importers. The second aspect is the analysis of the situation of the Japan pumpkin market especially of the market niche which the Tongan pumpkins supply.

There were two approaches used during the period of my research project.

1) The utilisation of action research as an approach to bring the decision makers and implementors of the development of the industry to collaborate in a participative discussion in order to coordinate a plan of action for the improvement of the production and marketing process.

2) The utilisation of a market analysis which was focused on the evaluation of the situation of the niche market and its environment as well as the potential competitors which may be a threat to Tongan pumpkin industry. The market analysis enables the decision makers, especially the exporters, to understand the situation of the niche
market and make appropriate decisions in production and marketing to maintain the niche market in a longer term.

The outcome of the research project is the understanding by the decision makers and the pumpkin growers, of the linkage between the production development and the requirements of the market. Through the process of action research, the collaborative discussion amongst the members of the research team as well as with the farmers, has brought the an understanding of the needs of consumers to be considered in the production process. This was evident in the improvements made in the quality standard and increased co-ordination of exporters in the 1992 pumpkin season. This is pivotal especially to the role played by farmers in production development. The research project concludes that there is potential for Tongan pumpkins in the niche market in Japan to improve the incomes of farmers and benefit the country as a whole. This requires the strategic plan developed during the process of the action research to be further emphasised.

A Strategic Plan for Future Development of the industry

A strategic plan has been already developed in the collaboration with the government and exporters as part of the action research process. The strategic plan is focused on the improvement of the quality standard of the pumpkins and on the control of the market share for the niche market in order to place the Tongan pumpkins in a competitor
position in the market place as well as to fetch a higher prices.

The research team discussed the overall operation of the industry particularly the production development aspect towards the end of the 1992 pumpkin season and agreed to further re-enforce the strategic plan used in the 1992 pumpkin season for further improvement of the industry. The strategic plan can be implemented effectively and efficiently if the support services given by the government and exporters are improved and coordinated towards the improvement of the farmers' practice.

The research team emphasised two main aspects of the strategic plan from their viewpoint for further implementing the strategic plan for the development of the industry.

a) The Elements of the Strategic Plan

The strategic plan has three main elements to focus on during its implementation from the view of the research team.

i) To build upon the strengths of Tongan pumpkins and exploit the advantages in the niche market.

ii) To concentrate and co-ordinate efforts of government and exporting companies alike on developing quality standard pumpkins.

iii) To redefine the role of the public sector in the development of the industry, and strengthen its capacity to
perform its major functions especially in marketing and technology in the industry.

b) Program Priorities

i) Building upon the farming system.

There is a need to reaffirm the importance of the industry with respect to the traditional farming system to the Tongan economy and to recognise that there is a system should be maintained for the benefit of the people as a whole.

Extension and other staff of the MAF should continue to be systems oriented and learn from farmers as well as give advice. There is a need to design and implement an integrated farming systems development program that can both preserve the farming system and increase the productivity of the pumpkin industry.

ii) Developing the present niche market opportunities and exploit other market potential.

Tonga can continue to explore other markets through market research. This requires market expertise and experience to investigate the market opportunities. At the same time, the exporting companies can improve the knowledge about the precise standards required by the niche market, the seasonal nature of demand and prices, transport and handling costs,
appropriate packaging, and the importing country’s marketing system and quarantine requirements. More importantly, the exporting companies require that a system be in place to ensure that Tongan pumpkins can consistently meet the demanding requirements of the niche market.

It would be useful if a post-harvest management program could be developed to help the exporting companies exploit its potential markets. This is linked to two important components in the marketing: the Quarantine Control and Inspection and Quality Control and Assurance.

Proposal

On the basis of the above priorities identified by the action research team, I, will now make some proposals of my own for the further improvement of the industry.

(a) The Government

The role played by the government in agricultural export industries such as the pumpkin industry is very important. There is a need for the government to make this industry one of its priorities and to formulate a sound policy to encourage and give incentives to the private sector to become involved in agricultural export marketing enterprises.

Regarding the development of the pumpkin industry the
government has to specifically formulate a sound policy to protect and develop the long term viability of the industry as well as its fragile niche market. It is also vital for the government to recognise the failures of the traditional agricultural export commodities such as bananas and watermelons in the 1980s, and learn a lesson from these failures so that an agricultural export policy can be thoughtfully formulated for the common interest of all people involved the industry, particularly the farmers.

The restriction of the issuance of export licences and market share to export companies should be continued in order to improve the quality standard and establish the Tongan pumpkins in the market. The government support services system be improved especially the marketing infrastructure for quality control.

(b) The Management of the Industry

The overall coordination and management of the operation of the industry must be supported by all parties involved, particularly the export companies. This is particularly important for the production and marketing development. Mutual understanding and cooperation amongst exporters and the government Ministries should be coordinated so that the niche market can be developed to its full potential.
(c) Production Development.

As mentioned above, quality management has to begin with the initial stage of production. All parties involved in production must work together to produce high quality fruits in an effective way that minimises production costs to growers.

The exporting companies should cooperate with the Tonga Development Bank and the Ministry of Agriculture and Forestry in coordinating the requirements (such as credit, input supplies, land preparation and training of farmers) to facilitate the field management practices of pumpkin growers.

A monitoring system should be introduced through which the production area, inputs used, advice given and several other data are recorded as a source of information for a review of the strategy for the improvement of the production development.

(d) Marketing

It is very important that Tonga handles about its international marketing of agricultural products such as pumpkins in a careful, planned and coordinated way.

To assure that the niche market of the industry is in competitive position, the marketing information system must
be improved and information disseminated to all parties involved in the industry in order to make a competitive marketing plan.

It should be realised that the linkages in the development of the pumpkin industry are made through four support activities: 1) The industry infrastructure; 2) the technological development; 3) human resource development; and, 4) the procurement activity. These support activities are based on the connective elements underlying the chain of resources including the human resources, technical resources, information resources and financial resources. These connective elements provide the thread between different activities in the development of the industry. The potential for success or competitive advantage of the industry is thus dependent upon how effectively these basic elements combine to perform the required activities at each stage of the development of the industry. The industry is a system of inter-related activities amongst the government, exporters, the Bank and the farmers. It contains complex inter-dependencies which provide opportunities for optimisation, as well as problems of co-ordination between the activities in the industry and the connective resources.

Reflection on Action Research Approach

The value of using action research principles in this type of research project has been demonstrated in this study. Because
the development projects are operated in a complex situation by people with different backgrounds, perceptions and needs, it is necessary for them to cooperate and participate in a collaborative discussion. Such a discussion is necessary in order to identify the perceived problems and concerns and find a desirable solution to improve the situation.

Action research as an approach has allowed the researcher to invite the problem owners and decision makers in the industry to participate in a collaborative discussion to identify the issues concerned with the production and marketing process as well as formulating strategies for the improvement of the operation of the industry. This approach is a learning system approach, involving experiential and action learning about human activity. Further collaborative research is required to further improve production development as well as the marketing process to ensure that the quality standard required by the Japanese consumers is achieved in order to maintain the niche market.

Although the aim of using action research was achieved in terms of applying a collaborative learning process to the development of the pumpkin industry, there were limitations as far as the action research process itself was concerned. These limitations were:

1) The members of the research team came from different organisations and institutions with different perceptions
about the operation of the industry. For example, the two exporters in the research team have different strategies in approaching the production and marketing process, so a compromise had to be reached in order to reach an agreeable solution for implementation.

2) Evaluation of the improvement made after the pumpkin season was difficult because each farmers' group had been directed by different exporters. Therefore, it was difficult for an overall strategy for the operation of the industry to be effectively implemented.

3) The other limitation was that members had limited time available for the action research project. This was mainly due to the workloads of each member in their respective jobs. In addition, the concept of action research was new for the team members and becoming familiar with the approach was time consuming.

I now think that the research should have started with only one exporting company and its group of farmers as the two main actors during the action research process. This would have been more effective and efficient because all the actors of the research team would be under one company. Thus, the action, planning, implementing, and evaluating process could be more productive. Then after a successful start with one company as the initial stage of introducing action research approach, further action research for the second stage could include other exporting companies in order to discuss and formulate an overall strategy not only to develop the niche
market to a competitive position but to explore further market opportunities.

Conclusion

Tonga has been fortunate to acquire a market in Japanese pumpkin imports. Although, the market niche is open for only a short period, it is crucial as this is the only market for the pumpkin industry.

The Action Research has identified and analysed the problems and concerns of the people involved in the industry. It was found that the 'Quality Standard' is the main issue as the long term development of the industry will depend on the quality standards required by the Japanese consumers.

It was also found that the overall administration of the operation of the industry is not well coordinated amongst the main parties involved especially the exporters and the government Ministries. The production process is undertaken by smallholder farmers who have never been involved in such a full commercialised farming enterprise before. As a result, an effective extension program is required to train the smallholder farmers.

From the analysis of the market niche, it is apparent that the growth trend for the niche market has a great potential for the future of the Tongan pumpkins provided the quality
standards required an consistently supplied. Moreover, the niche market environments are favourable for an export market development. This, gives an opportunities for the exporters who will establish a good business relationship with the Japanese importers.

It is obvious from the outcomes of the Action research that the Tongan pumpkin industry has not established itself competitively at the market place as well as the trust of the Japanese importers in order to enter to the Japanese business arena. This was aggravated by the pumpkin crisis in 1991 season which further damaged the reputation and position of Tongan pumpkins in Japan. As a result, the Japanese importers have questioned the business capability and reliability of the Tongan exporters.

Although the mishap involved with the operation of the industry in 1991 season was a setback for the development of the industry, the government has intervened promptly to revive the fragile market. This has been through introducing export regulations for pumpkin exports as well as limiting the market share of exporting companies.

The negative as well as the positive impacts of the development of the industry have been identified. These impacts should be monitored in order to maintain sustainable agricultural development for the benefit of Tongan society.
The objectives of the Action research were to gain experience, competence and improve the practice of the people involved has been achieved. This achievement was due to the collaborative discussion and learning amongst the members of the research team and the farmers.

The collaborative discussion has improved the understanding and competence of the researcher as a learner in a real project situation. It has also given an opportunity to the members of the co-research team to share views and their experiences as well as learn from each other, focusing on issues concerning the development of the industry which would help farmers to improve their practices.

The improvement made (such as improving quality standards) would place Tongan pumpkins in a competitive position at the market place which will give more opportunities for the industry to increase market share and fetch higher prices. Thus, Tonga's foreign exchange earnings would increase as well as the income of the farming community in particular. This will enhance the standard of living of the Tongan society as a whole.
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Appendix A

MARKETING PLAN OUTLINE

I. INTRODUCTION.
   What is the product and why will you be successful with it at this stage?

II. SITUATION ANALYSIS

   1. The Situation Environment

      A. Demand and demand trends. What is the forecast demand for the product? Is it growing or declining? Who is the decision maker, the purchase agent? How, where, what, and why do they buy?

      B. Social and cultural factors.

      C. Demographics.

      D. Economics and business conditions for this product at this time in the geographical area selected.

      E. State of technology for this class of this product. Is it high-tech state of the art? Are newer products succeeding older ones frequently (very short life cycle)? In short, how is technology affecting this product?

      F. Politics. Is politics (currently or otherwise) in any way affecting the situation for marketing this product?

      G. Laws and regulations. What laws or regulations are applicable here?

   2. The Neutral Environment

      A. Financial environments: How does the availability or non-availability of funds affect the situation?

      B. Government environments: Will legislative action or anything else currently going on in government be likely to affect marketing of this product?

      C. Media environments: What is happening in the media? Does current publicity favour or disfavour this project?

      D. Special interest environments: Aside from direct competitors, are any influential groups likely to affect your plans?
3. The competitor environment

A. Describe your main competitors and their products, plans, experience, know-how, financial, human and capital resources, suppliers, and strategy. Do they enjoy any favour or disfavour with the customer? If so, why? What marketing channels do competitors use? What are your competitors' strengths and weaknesses?

4. The Company environment

A. Describe your product, experience, know-how, financial, human and capital resources, suppliers. Do you enjoy any favour or disfavour with the customer? If so, why? What are your strengths and weaknesses?

III. THE TARGET MARKET

1. Describe your target market segment in detail using demographics, psycho-graphics, geographics, lifestyle, or whatever segmentation is appropriate. Why is this your target market and not other segment?

IV. PROBLEMS AND OPPORTUNITIES

1. State or restate each opportunity and indicate why it is in fact an opportunity. State or restate every problem and indicate what you intend to do about each problem.

V. MARKETING OBJECTIVES AND GOALS

1. Precisely state marketing objectives in terms of sale volume, market share, return on investment, or other objectives for your marketing plan.

VI. MARKETING STRATEGY

1. Consider alternatives for overall strategy. Further describe your strategy as to whether you are using product differentiation, market segmentation, or positioning, etc., and how will do to take advantage of the opportunities created and avoid the threats.

VII. MARKETING TACTICS

1. State how you will implement the marketing strategy chosen in terms of product, price, promotion, distribution, and other tactical or environmental variables.
VIII. CONTROL AND IMPLEMENTATION

1. Calculate break-even chart for your project. Compute sales projections on a monthly basis for a three year period. Compute cash flows on monthly basis for a three year period. Indicate start-up costs and monthly budget for this period.

IX. SUMMARY

1. Summarise advantages, costs, and profits, and clearly state the differential advantage that your plan for this product or service offers over the competition and why the plan succeed.

X. APPENDICES

1. Include all supporting information that you consider relevant.

ACTION RESEARCH TO IMPROVE THE PUMPKIN INDUSTRY IN TONGA.

BY

TEVITA TOAPA

MASTERS OF SCIENCE (HONS) THESIS
IN AGRICULTURAL PRODUCTION AND MARKETING IN SYSTEMS AGRICULTURE

UNIVERSITY OF WESTERN SYDNEY, HAWKESBURY
SYDNEY.
FEBRUARY 1994.
Please Note

The greatest amount of care has been taken while scanning this thesis,

and the best possible result has been obtained.
DECLARATION OF ORIGINALITY

Except where the contributions of others are acknowledged, especially my co-research team, this thesis is the result of my original research and has not submitted to any other University.


Tevita Toafa.
Agriculture is the most important sector in the economy and livelihood of the people of the Kingdom of Tonga. It is based on smallholder production for home consumption and cash crops.

Agricultural industries play a key role in promoting the economic prosperity and growth of Tongan society. Agricultural exports, such as the pumpkin industry, receive foreign exchange to pay for the imports.

Despite the stagnation of the traditional export crops, such as coconut and bananas in the 1980's, the inclusion of the pumpkin in agricultural exports in the late 1980's has revived and boosted the economic growth in Tonga.

The Pumpkin industry operates on a seasonal basis exporting to a market niche in Japan from November to January. In the 'pumpkin crisis' in the 1991 season, the exporters and the pumpkin growers flooded the Japanese niche market with low quality and underage pumpkins. This crisis has stimulated the author to explore the problems and concerns of the main parties involved in the development of this important industry, through an action research project.

This project aims to develop an understanding of the problems involved in exporting pumpkins from Tonga to the Japanese niche market. It also aims, as an action research project, to increase the understanding of the problem owners in order to improve the operation of the industry.
The Pumpkin industry is operated by several exporting companies and their farmers' groups with support services such as research and extension contributed by government departments and financed by the Tonga Development Bank.

The inquiry explores the perceived problems and concerns of all parties involved in the development of the industry including the exporters, farmers, government departments and the Tonga Development Bank as well as the Japanese pumpkin importers.

The inquiry used a systems approach, utilising action research methodology as an entry point to conduct a collaborative inquiry. The action research approach has allowed the author to form a co-research team from all parties involved in the industry. The co-research team participated in a series of research meetings discussing and identifying the problems and concerns regarding the development of the industry.

A market analysis of the niche market of the pumpkin industry was carried out in order to develop understanding among the main parties involved in the industry of the "hostile" situation of the Japan pumpkin market and its environment.

The following have been identified as the most important factors in the development of the industry.

* It was found that the low quality standard of pumpkin
exports has been the main concern as it hinders the
development of the niche market. Low quality pumpkin is
caused by a variety of associated problems starting from
the farmers' field operations up to the marketing
process handled by the exporters.

* Insufficient government support services such as
quarantine regulations, marketing facilities and
research and extension services as well as funding the
research programs have also contributed to the low
quality standard.

A cooperative effort is required from all parties involved in
the development of the industry so as to formulate a
competitive strategy concentrated on the development of the
niche market as well as the potential external competitors,
otherwise this niche market will be lost.

Partly as a result of the action research project a strategic
plan for the industry was developed and this has already led
to changes in industry practices.
ACKNOWLEDGMENTS

The author wishes to express his thanks to the many people who have given help and encouragement in completing this thesis. Special thanks go to the members of the Supervisor's panel especially to the chairman Dr Robert J. Fisher who had a major role in providing me with my first research experience in all stages of the research project. I am grateful for his enthusiasm and constructive critique as well as editing the final draft of the thesis. His advice and encouragement during the course of my thesis writing was much appreciated. Without his help, the study would have had considerably less value to me as a learning experience. I also thank to Nick Truelove for his supervisory role in the marketing aspect of the thesis.

I also wish to thank Elwin Turnbull for his constructive comments on the marketing aspect of the thesis. I am grateful to Mary Eastering for her general comments and for editing the first draft.

I am especially grateful to my research team in Tonga including Simione Sefanaia, Lisiate 'Akolo, 'Aleki Sisifa, 'Ofa Fakalata, Tevita Holo, 'Otenili Tu'ipolotu, Sulunga Lavaka, Sione Foliaki, Konrad Engleberger, Sitiveni Takaetali Finau and Steve Edward for their advice and support and their willingness to participate and contribute
their expertise and experience throughout the process of the action research approach. Without their participation in collaborative discussion, the objectives of my action research project would not have been achieved.

Thanks are also due to the numerous people in Tonga who willingly gave their time to help during the informal interviews and inquiry in my field work. These thanks go especially to the Managing Directors of all the Exporting Companies including Dr Feleti Sevele, Hon. Mailefihi Tuku'aho, Tsutomu Nakao, Kesomi Siale and Siua Tai. Special thanks go to the Ministry of Agriculture and Forestry especially to the Research and Extension Divisions for their staff who assisted in my field work as well as supplying the research information.

I also thank to all pumpkin farmers and farmers' groups who made available their time to discuss the problems of the industry and express their views concerning the development of the industry during my field work.

I am also extend my grateful to the Managing Director of the Tonga Development Bank, Peni Vea and the Bank's Management for allowing me to use the facilities of the Bank during the course of my field work.

A special thanks goes to the Australian International Development Assistance Bureau for the study award which
enabled me to pursue this further study. I also thanks to the School of Agriculture and Rural Development for the financial assistance which assisted me to conduct my field work in my country Tonga.

Last but not least, I would like to thank my wife Va and son Winston for their encouragement and support. I also thanks my brothers and sisters for their support.
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GLOSSARY

Abbreviations

BOT = Bank of Tonga.
CDP = Central Planning Department.
C & F = Cost and freight.
FAO = Food and Agriculture Organisation.
f.o.b = free on board.
GDP = Gross Domestic Product.
GNP = Gross National Product.
JETRO = Japan External Trade Organisation.
MAF = Ministry of Agriculture and Forestry.
MLCI = Ministry of Labour, Commerce and Industries.
S.W.O.T = Strengths, Weaknesses, Opportunities, Threats.
TDB = Tonga Development Bank.
QQMD = Quarantine and Quality Management Division.

Currency

Tongan currency is Pa'anga (T$) for dollar and seniti for cent.

\[ T$1 = A$1.20. \]
\[ = US$0.90 \]
\[ = Yen 110 \]